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CHICAGO, JANUARY, 1915

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CONVENTION TIME.

CONVENTION time this winter means, as it meant a year ago, two conventions; and even more, it means actually two distinct and separate events. The Independent Telephone Association of America and the National Independent Telephone Association last year held their annual meetings in the same city, at the same hotel, and only a few days apart. This year the new association holds its convention January 19 to 21 at Hotel Radisson, Minneapolis, Minn.; the old association holds its convention at Hotel La Salle, Chicago, February 3 to 5. There is a fortnight of time and four hundred miles of travel between the two events.

This particular feature of the 1915 arrangement is looked upon with some disfavor by those manufacturers who are thus forced to stand a double expense or reject one of the two opportunities. The commercial spirit cannot see any good reason for two independent associations anyway, and particularly when they manifest a disposition to get farther apart rather than nearer together.

Without discussing the merits of the argument just now, we want to urge that even the most dissatisfied manufacturers hold their patience for this once more, and continue to co-operate with both associations in the matter of convention exhibits and attendance. It may be the last time they will be even asked to do so; for the next year will surely bring changes in the relations of the two independent bodies.

We have always regarded the existence of two associations, both ostensibly serving the same field, as economically wrong. In this we are not disputed; the point of difference is in the belief that the two organizations do not serve the same field, and are not interchangeable. That amalgamation of the two is not impossible, however, is the belief of many; and those who are interested will not be idle during 1915. That is why we say that the manufacturers may not have the problem to face next season, and so should not deal too impatiently with it this time.

The independent cause has been growing in strength for the last year or two, and a big and lively convention at Minneapolis this month is assured. For this reason those who intend to go will do well to make immediate arrangements.

1915.

NINETEEN-FOURTEEN has turned out to be an extraordinary year. It has upset many of our theories of civilization, destroyed much of our faith in human kindness, thrown us all into a condition of doubt and uncertainty that has affected all our activities. The telephone operating business, that has weathered severe financial storms with much less strain than is occasioned by any good spell of wind and sleet, and has gone through

panics without a flutter, has actually learned the meaning of the word retrenchment and realized that a "psychological" depression may be a very tangible thing. We can admit so much now that it is all over, and 1915 is opening up with a promise of more real business gain than all we ever dreamed of losing. And if the loss was psychological, the gain will be actual, tangible, practical. The resumption of normal and abnormal activity in plants that have been closed means, of course, immediate demand for more telephone service. The return to steady employment of many who have been out of work brings its corresponding increase in residence telephone use, on which is hinged the use of the retailer's telephone and that of his wholesaler and his manufacturer. We are so interdependent for our prosperity that we must get busy as soon as our neighbors begin to work.

So much for the commercial side. In engineering, 1915 brings us the public use of the transcontinental line from New York to San Francisco as the biggest definite step forward. The adoption of automatic telephony for the service of Minneapolis and St. Paul, as well as some Ohio cities; the addition of another semi-automatic installation at Lima, Ohio, as well as the new one at Newark, New Jersey; these are commercial as well as engineering triumphs of the line between the years and furnish new arguments for the advocate of automatic switching as the logical successor of the manual system. From this encroachment the friends of manual apparatus have defended themselves by making their equipment so nearly automatic in operation as to seem to leave little to be desired in the way of change. Out of this work has come the "too-quick telephone" mentioned elsewhere, which quite properly belongs to 1914's history.

Politically 1914 experienced a marked accession of strength to the independent side of the business, and 1915 promises a still greater independent activity. Imaginative persons might charge the apparent reopening of the old Bell-independent war to the same strange aspect of that red planet, Mars, whose occult influence must account for the universal unsheathing of swords. We prefer to believe, however, that the responsibility rests with a few loyal independent souls who some time ago associated with the object of preserving the spirit of commercial independence, and whose personality and example have been strong enough to fire again the old spirit of enthusiasm.

Whatever effect the extraordinary events of 1914 have had on our and other industries, through the profound mental disturbance that followed, there is no reason to doubt that 1915 will be a good year for the United States and its people. We cannot feel confident that the European war will end this year; but we are quite sure that it has already ceased to have any bad effect upon us. This country is a world—nay, a universe—in itself. We are competent to transact our own business without the help of any other nation, and to take care of our own prosperity. After the first shock of horror we have learned that truth; and now it is wholly up to us. If each of us keeps busy at his own little bench, not stopping work to look out the window at the fight which is none of our business, we cannot keep prosperity away. And always we can be thankful that our country is at peace and serene, and our industry is necessary to the daily turning of the world on its axis. So we wish all our readers a Happy New Year with full confidence that they will get it.

THE TOO QUICK TELEPHONE.

WE are surely making progress these days. Reports from recent installations of at least two different types of exchange apparatus have it that the new kinds of equipment are too fast for the people. The subscriber lifts his receiver from its hook and the operator pronounces her "Number, please?" before he can get it to his ear. Then she has to wait a second and ask again. The operator's response is instantaneous; the subscriber requires a second of time in which his hand may traverse the space between the receiver hook and his ear. That second, from an operating standpoint, is a total loss. With the present form of subscriber's apparatus one-second service is better than instantaneous service. But if we can get instantaneous service we must find some means of taking advantage of it.

For the operator to allow a second to elapse before answering would satisfy the subscriber; but the loss would still be there. There are two methods by which the subscriber himself could make the saving: The desk set user, who usually grasps the neck of his instrument with his right hand while talking, might be trained to hold his right thumb on the switch-hook until his receiver is in position. Or he mgiht more easily accustom himself to giving his call number the instant he lifts the receiver; though in this case he would lose the feeling of certainty which comes from answering the operator's question. Neither of these methods is very practical.

A time element relay to slow down the operator's signal until the slow moving receiver could properly connect with the subscriber's auricular apparatus is the most apparent solution of the difficulty. But the real seat of future dissatisfaction, it seems to us, will be in the form of the subscriber's set. It should not require an appreciable lapse of time to get into talking position after laying hands on the instrument.

The *modus operandi* of the telephone user has not changed since the substitution of a fixed transmitter for one that was hung on a cord like a second receiver. The most modern set is constructed as though our mouth and our left ear were entirely independent of each other. We are instructed to place our lips close to the transmitter, yet we are provided with enough receiver cord to take us two feet away from it. When we are in proper talking position the receiver's location is just as fixed and definite as that of the transmitter, to which it bears a practically constant relation in space. Yet the receiver is moored on a slack line that gives inefficiency its maximum opportunity and forces us to make two adjustments—our face to the transmitter and the receiver to our face. One of these is obviously superfluous. The flexibility of the receiver cord does us no good whatever. We cannot travel with it because we are bound to the transmitter, and cannot move unless we take the whole instrument with us. A good many desk set users actually do hold the set up with the right hand and the receiver with the left, so that both hands and both lips are engaged at once in the simple act of telephoning.

Europe is ordinarily regarded as being far behind this country in the matter of telephone equipment and service. Often we see European pictures of curious looking subscribers' instruments and laugh at their grotesque and antique effect. The most amusing variety is the one that looks like a little nickel-plated loving cup with a dumb-bell on top of it. It is really nothing more nor less than an ornamental variety of what we know as the hand microphone, or hand-mike for short, with its support.

And as to the hand microphone's inferiority to the American type of desk set, that is a disputable question. We are not at all sure that it is not much the better of the two. Its transmitter and receiver are together in a single package on a cord as long as desired, which makes for a maximum of efficiency and a maximum of convenience and flexibility. It takes up less room and may be kept anywhere or carried anywhere. It does away with a good part of the necessity for extension sets; for it may be plugged into a jack in any room at will. And with a spring switch in its handle taking the place of the hook switch, it solves the problem of too-quick service. The user simply brings it to talking position and then presses the switch; the operator responds instantly and the connection is made in the time that, with the standard type of set, would be wasted. That means better service and lower operating cost.

Unless some bold inventor takes the standard set by the horns and redesigns the whole thing to agree with modern methods of efficiency, the hand-microphone is yet destined to find a big place in this country among those who have laughed at the European pictures of it.

AN AFFRONT TO THE PUBLIC.

POSSIBLY the people of New York will take a slap in the face in more kindly fashion than will the inhabitants of other big cities. Not that the metropolis has ever had a reputation for saintliness, or even humility. But we are quite sure any Chicago man would become justifiably violent on finding attached to his monthly telephone bill such a notice as the following:

2024

Special Notice.

The established practice under which our collection work is handled provides for suspension of service when payment of the amount due is not received by the 15th of the month. We shall appreciate a prompt remittance.

NEW YORK TELEPHONE COMPANY.

This, it will be distinctly understood, is not a delinquent notice. It is attached to each and every bill sent out from the offices of the New York Telephone Company to its New York City subscribers.

Readers of those very interesting employes' magazines published by a number of the Bell operating companies have been amused by a series of cartoons designed to show that the long-suffering telephone companies stand much abuse at the hands of the public. Subscribers exhibit wrath when asked to pay for telephone service in advance—and the cartoon shows that they pay for everything else, from street car fares to rent, before they get it. They cry out against a nominal charge for moving a telephone that has never earned even the amount of that charge; yet the cartoon shows that they pay cheerfully for everything else of the same nature. And so on. The cartoons are good because the condition is, in the main, true. Telephone companies often have difficulty with small items that give other public utilities no trouble to speak of.

But in New York the tables seem to be turned. That little blue slip on the New York Telephone Company's bills is redolent of the good old days of Colonel Vanderbilt, of arrogant corporations and a public foreordained to damnation.

No doubt it is entirely proper to cut off service when a customer will not or cannot pay for it. We believe it is customary and according to instructions for street car employes to put people off the car if they refuse to pay their fares. Why not, then, post a sign conspicuously at the entrance of every street car, to this effect:

In accordance with our custom, any passenger not paying his fare as soon as he steps on this car will be ejected by the conductor, and if necessary the motorman will assist him.

The thing has interesting possibilities. The grocer, for example, being engaged in what may be regarded as a rough and ready business, might successfully use a very brief and terse form, in this wise:

Pay this bill when you get it, or keep out of my store.

The restaurant keeper, who ordinarily extends credit to his customers from the time they put salt on their meat until they reach the cashier's desk, could easily figure out an effective little notice to be printed on the waiters' checks:

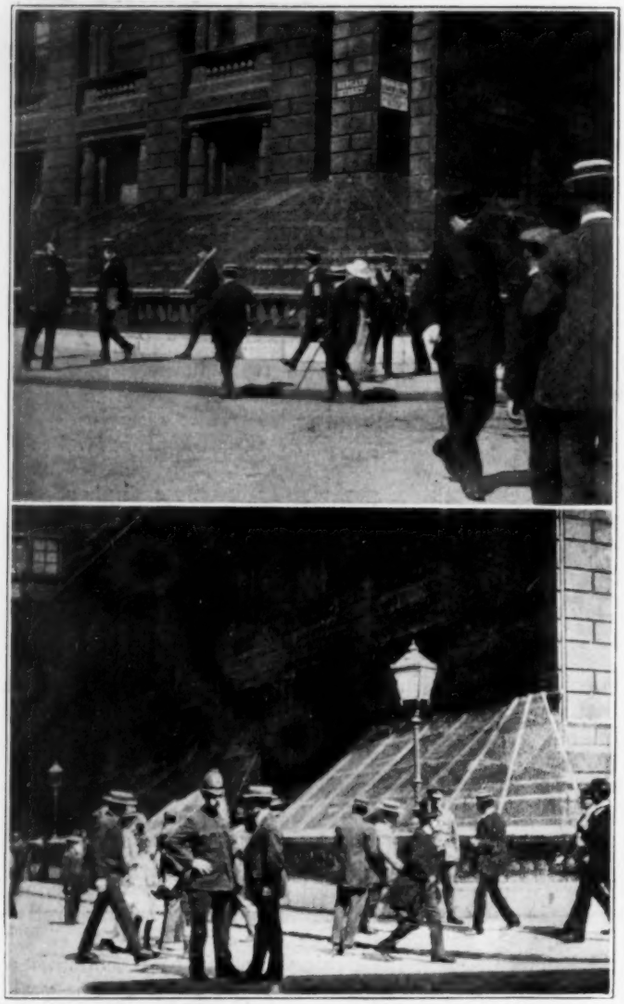
If you try to slip past the cashier without paying the lowest amount on this check, you will never get another meal in this place.

We could continue indefinitely, for the subject is interesting and entertaining. But as this is a telephone paper we feel constrained reluctantly to abandon the larger field and return to a discussion of the New York Telephone Company's blue slips. It is a constantly reiterated notification to each individual subscriber that the company expects him to become delinquent and is watching him; that his personal responsibility is a joke and his credit nonexistent; that he can only get telephone service in one place and if he doesn't toe the mark pretty carefully he can't get it there.

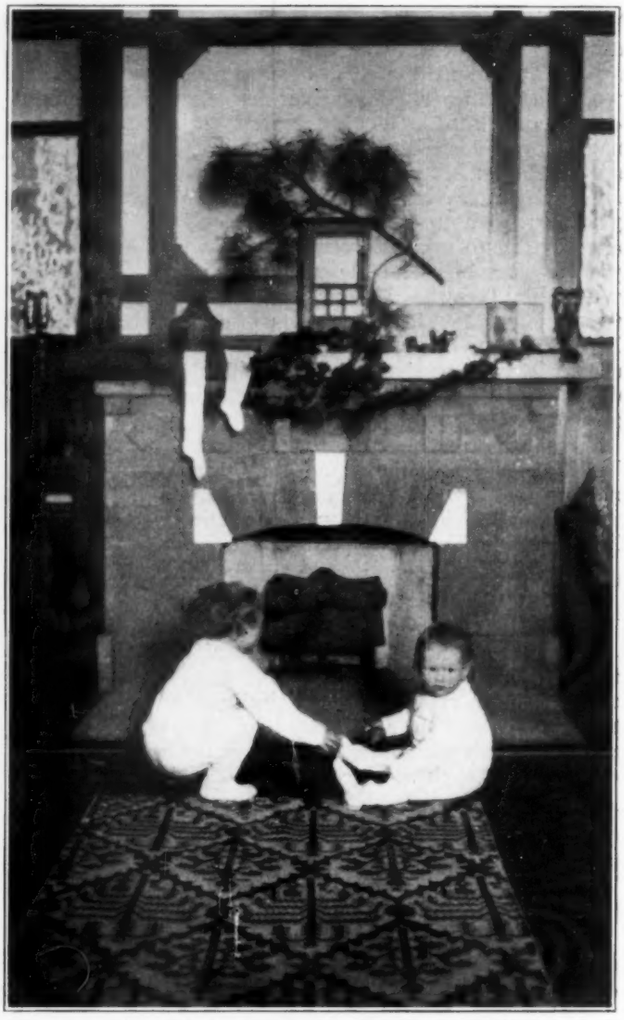
It is just such little things as this that economists overlook when they argue that the telephone is a natural monoply. The one thing needed to make the New York Telephone Company haul down that blue Jolly Roger in a hurry is some vigorous, wholesome competition. The biggest operating telephone company in the world is the best example we have surviving today of the type of corporation that is responsible for the general dislike of public service companies. The best, possibly the only real, cure for that condition is competition, just as a vigorous and insistent young brother is the best thing in the world for a spoiled child. The New York Telephone Company never had any competitive brother to chasten its spirit, and the only other influence that has a similar effect is the rod, sorrowfully but firmly applied.

ORDER FOR THE SERIAL NOW.

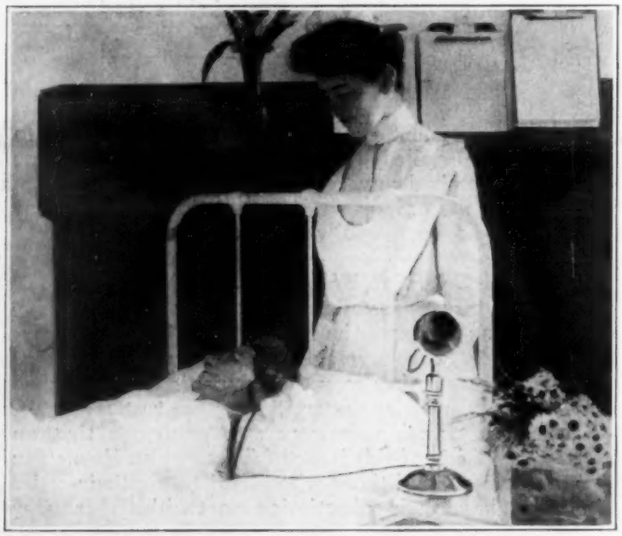
THE introductory installment of the serial "Telephone Talks" by Messrs. Cummings and Kneisel appears in this number. We have already explained the purpose of this serial in making easy the acquisition of telephone knowledge, and will let the article say the rest for itself. We take this occasion, however, to announce that an extra large edition of this issue of TELEPHONE ENGINEER has been printed, and those who failed to get their order in early can have their subscription start with the January number just the same. But as there is a very heavy demand for these copies we advise all who want to read the serial (and that means all the workers in the telephone field) to send their subscriptions in *now*.



London Postoffice Telephone Exchange in Wartime, Showing Protection Against Dynamiters—Above is Newgate Street, St. Martins-le-Grand Corner; Below is Roman Bath Street, Corner Newgate—Journal of Post Office Electrical Engineers, London.



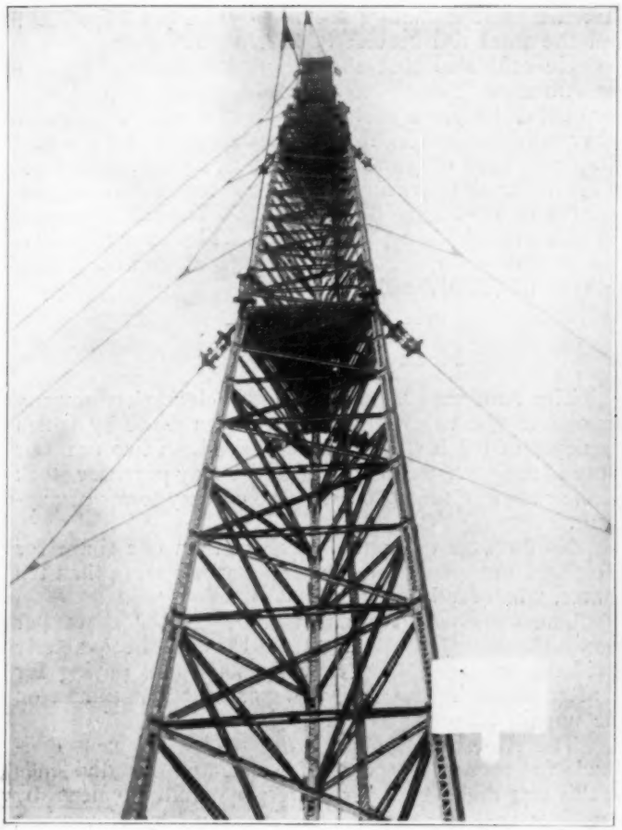
Watching for Santa Claus—Photographic Study Taken by Edward I. Pratt, Advertising Manager of the Kellogg Switchboard and Supply Company.



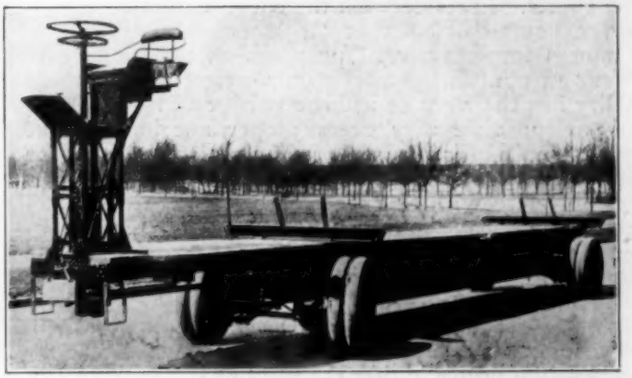
New York Hospital Patient Listening to Sermon Telephoned From a Distant Church.

Laying Telephone Conduits at the Panama-Pacific Exposition, San Francisco.

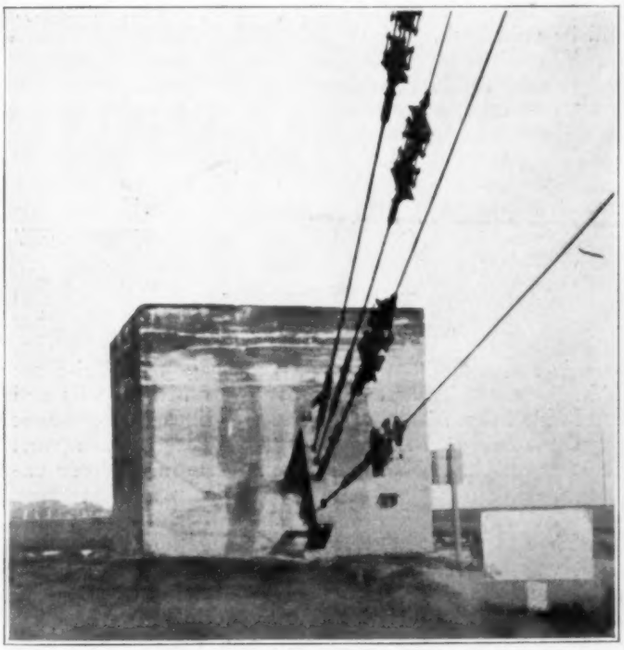
STORIES IN PICTURES OF TELEPHONE PRACTICE AND PROGRESS IN ALL PARTS OF THE WORLD.



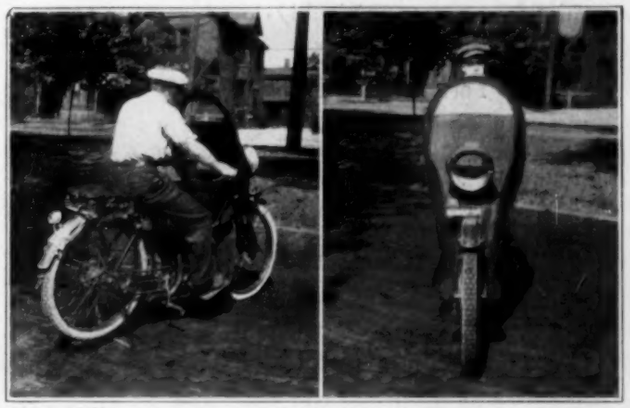
Mast of the Tuckerton, N. J., Wireless Station, 860 Feet Tall, the Highest Structure in America—This is the Station Which Was Closed by the United States Government for Sending Messages to Germany in Violation of Neutrality, and Later Allowed to Resume Operation—Photo Copyright, 1914, Hearst-Selig News Pictorial.



Two Views of a Specially Built Electric Truck for Hauling Telephone Poles; Used in Philadelphia



Concrete Anchor Weighing 1,200 Tons to Hold the Tuckerton Wireless Mast—Photo Copyright 1914, by Hearst-Selig News Pictorial.



A Recently Improvised Windshield for Trouble-Shooters' Motorcycles—It is Very Light and Quite Effective.

STORIES IN PICTURES OF TELEPHONE PRACTICE AND PROGRESS IN ALL PARTS OF THE WORLD.

Ohio Decision Bears on Competition

A decision which, if upheld, will have a far-reaching effect on all Ohio telephone and lighting and power franchises has been tendered in the Cincinnati courts on the action brought by the city on demand of the Union Gas and Electric Company against the Diamond Light Company to prevent the latter laying lighting conduits in the street. In its decision refusing to restrain the Diamond company from laying the conduits, the court holds that a monopoly of the lighting business of a municipality or for the furnishing of electricity for commercial purposes cannot be given to any corporation or individual, and that competition can enforce its rights. The court holds that the abutting property owners have the use of the streets and highways, and where they agree they can grant the right to lay conduits under a street or to string wires so long as there do not interfere with the use of the streets as thoroughfares. The Diamond Light Company operates an isolated plant in a theater building, and recently began selling current for commercial purposes. In doing so it secured the consent of property holders to lay wires across streets and alleys without securing a franchise from the city. The Union Gas & Electric Company protested, and the city sought to enjoin the Diamond Company. The court held that even if the city had ordinances requiring its consent to the stringing of wires or laying of conduits, the refusal to consent could be contested in the courts. In its decision the court holds that it was never contemplated that "a monopoly of lighting business for commercial purposes should be given," that "an abutting owner upon a street of a municipality has the right to use the street and highway for any purpose he may deem proper not inconsistent with the use of it as a street and may lay water mains or electric light conduits and wires, provided he does not interfere with the use of the street as a street," and that he may "grant the right to connect his property with the property on the opposite side of the street to any person or corporation desiring to make the connection, provided that it does not affect the rights of the municipality in the street." Appeal will be taken from the decision, and in case it is not reversed it is probable that the utilities commission will be appealed to, as under the decision any isolated plant, by securing the consent of property holders, could extend its service indefinitely even without a franchise from the municipality in which it operated.

New York Hearing Brings Out Figures

Testifying at the public hearing on telephone rates before Public Service Commissioners Van Santvoord and Emmet in the Metropolitan Building, Dean Langmuir, accountant of the commissioners' investigators, brought out the fact that the New York Telephone Company had an undivided surplus of earnings of $21,958,179.82.

He said also that the company owns more than $65,000,000 worth of stock in associated companies and $5,000,000 worth in telephone companies not associated. He testified that the New York Company had invested in securities $81,927,909.44 on June 30, 1914.

The income and disbursements of the New York Company for the first six months of this year showed that the total exchange revenues were $12,065,884.64, and the total toll service $2,579,788.27.

He said also that the New York Company pays the American Telephone and Telegraph Company 4½ per cent of its gross revenues as a license fee. Certain other reductions were made which gave the total operating revenues on June 30 as $14,039,277.51.

The total operating expenses for the first six months of 1914 were $7,658,961.30. The net revenues for this period were $6,380,361.21. The company also had revenues for the six months from non-operating sources of $2,905,689.61.

Stock for Bell Employes

The American Telephone and Telegraph Company announces that arrangements have been made by which employes of the Bell system who have been two years or more in the service and who so desire may purchase stock of the company for $110 per share on easy terms of payment.

No employe can purchase more than one share for each $300 of annual wages he receives nor more than ten shares, whatever his wages.

The terms of payment will be $2 per share per month, beginning with March, 1915, and the quarterly dividends paid on the stock will go towards paying for it after deducting interest at 4 per cent per annum on the unpaid balances.

The American Company has paid 8 per cent dividends for seven years and it is calculated that dividends at this rate and the $2 per share per month payments by employes will pay for the stock in full by November, 1918. Any employe who so desires can after March 1, 1917, but not before, pay in the balance on his stock and receive his stock certificate.

Should an employe leave the service or die before his stock is fully paid for, the amount he has paid in, plus the accumulated dividends (less 4 per cent interest), will be paid back.

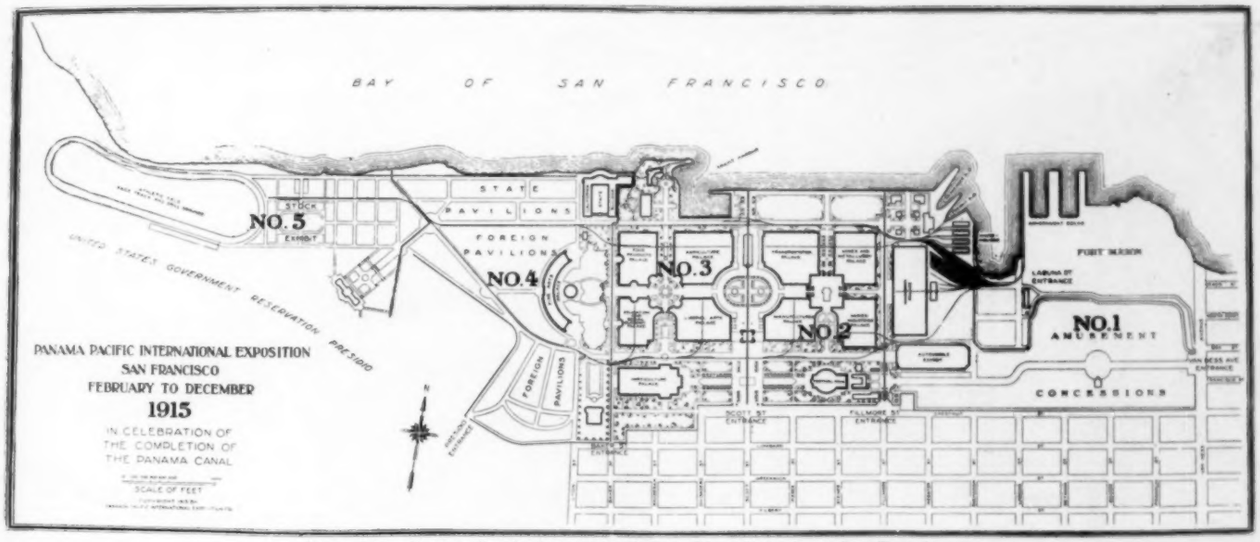
The American Telephone and Telegraph Company has about 60,000 stockholders and 160,000 employes. Its issued capital stock is nearly $350,000,000 and is quoted on the stock exchanges at about $118 per share.

The company makes it plain that no employe is under any obligation to buy any stock, but it is believed that a considerable number of employes will take advantage of this opportunity to save a little money every month and invest it in the business.

Automatic for Tri-State

As announced in our advertising pages, the Tri-State Telephone and Telegraph Company of Minneapolis and St. Paul, Minn., has ordered 35,700 lines of automatic telephone equipment from Automatic Electric Company, Chicago, displacing manual switchboards in thirteen exchange offices.

President G. W. Robinson and other officials of the Tri-State Company, before authorizing the order, made what was probably as thorough an investigation of the merits and demerits of automatic telephony as any telephone system ever received. Subscribers were interviewed, other plants examined, and experts consulted over and over again. The decision to adopt automatic is therefore a big triumph for Automatic Electric Company, whose apparatus is to be used.



Map of the Panama-Pacific International Exposition Grounds at San Francisco.

Panama-Pacific Exposition's Telephone System

Constructing the Biggest Temporary Installation in the World

BY A. McBIRNEY

AN EXPOSITION presents an unusual problem in that to be financially successful it would have to earn enough within the short period of its life—from 6 to 10 months—to pay all operating expenses and return the money invested. Fortunately, the success of an exposition is not measured by the financial showing, but every effort should be made to make the net loss as small as possible, and at the same time give the public the usual and expected comforts and conveniences.

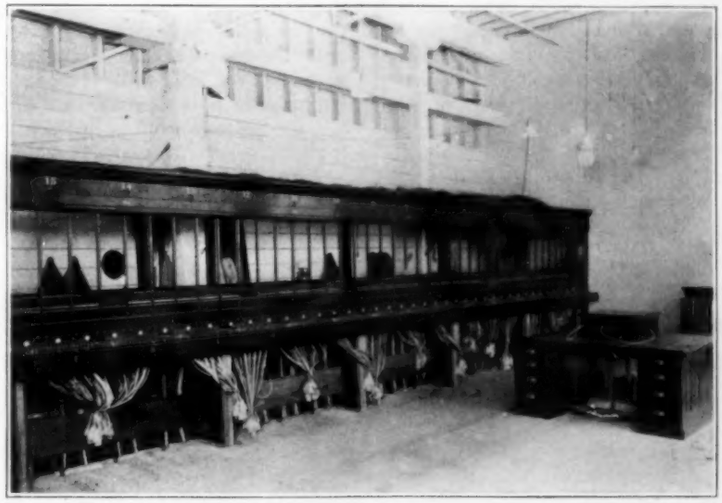
An analysis of an adequate and satisfactory telephone service shows fine possibilities for the incurrence of a heavy loss. In connection with the Panama-Pacific International Exposition, the first thought was to have the telephone service within the Exposition grounds handled by the local telephone company, but the handicap that confronted the company was the fact that, as a public service corporation, it would be required to install telephones upon demand and could only charge the legal rates, which rates are predicated on the average long term use of the equipment and are obviously not sufficient to cover short term operation where the cost of installing and removing the equipment is to be charged against the cost of service.

The solution of the difficulty was arrived at by the exposition taking over the telephone business within the grounds and operating in conjunction with the local company as a large private branch exchange.

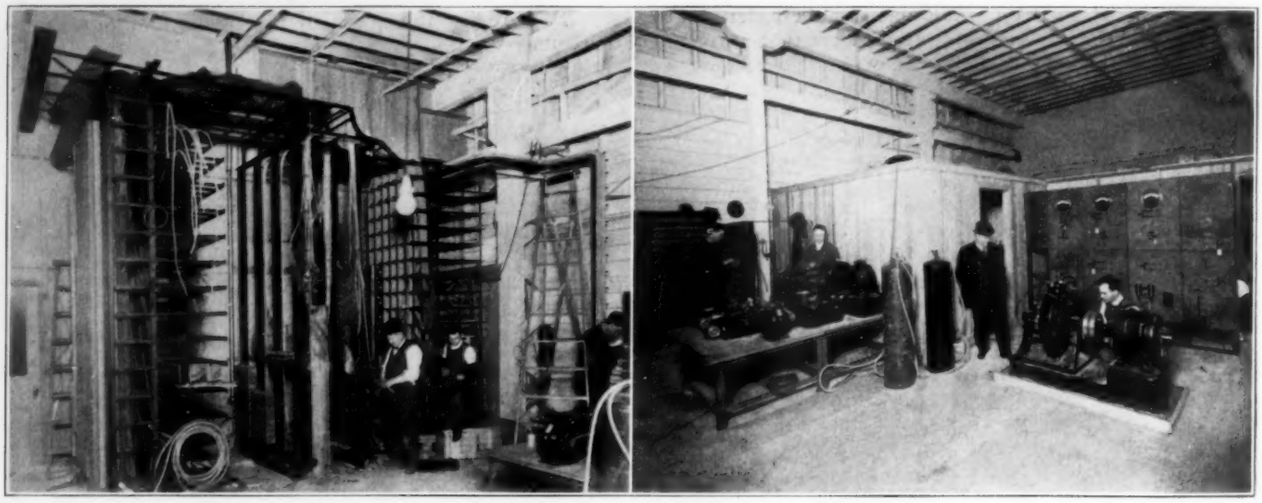
In order to keep the plant equipment down to a minimum without inconvenience to the public and participants, it was decided to install 36 attended pay stations, on the assumption that the number of participants who really need telephones are comparatively few, and that the requirements of most participants and the general public can be cared for best from the attended pay stations.

Reference to the map of the Exposition grounds, on this page, shows the distribution problem at a glance. The Exposition grounds have a frontage of over two miles on the Bay of San Francisco, and are contiguous to the residential section of the city. The area enclosed is 625 acres, and for reference is divided into four sections; the Zone, devoted to amusement features, being on the east; the exhibit buildings section in the center, comprising 13 large buildings, west of which lie the states and foreign sites, live stock exhibits, athletic field and race track sections.

There will be 150 buildings on the Zone, and in the exhibit buildings there will probably be some 2,000 exhibit booths, and adjacent to the palaces, 75



Installing the Panama-Pacific International Exposition's Telephone Switchboard in the Food Products Building, Shown on the Map at the Upper Left Hand Corner of Section No. 3.



Distributing Frames and Power Apparatus in the Exposition Telephone Exchange.

small detached buildings to be used for various purposes.

The states and foreign sites will contain 200 buildings of varying sizes, and on the stock exhibit section, athletic field, and race track there will be 25 buildings.

The distribution system, except in the district west of the states and foreign sites, is underground and the telephone cables are run in the same conduit as the light and power cables. The type of conduit installed was the result of careful study, and was designed primarily to secure mechanical protection to the ducts during the period of the building of the Exposition and against subsequent damage by workmen excavating for water, gas and sewer connections. How well this design has fulfilled expectations is evidenced by the fact that no damage has been done to the duct lines although some of the lines were exposed for long periods and had heavy timbers piled on them. These exposed lines were driven over by heavy teams, and were subsequently used by contractors for the support of building scaffolding—in one case the duct line supported the scaffolding for a tower 150 feet high. The conduit is made up of 3 inch Orangeburg fibre duct having walls ⅛ inch thick. Sleeve joints are used throughout. The ducts are laid in wooden boxes and the spaces between ducts filled with sand sluiced into place with hose. The pictures on this page give an idea of the construction features, and attention is called to the side and bottom splices on the boxes, which give a continuous girder form of construction. Where the ducts enter the manholes, concrete instead of sand was used for a distance of four feet, in order to anchor the ducts securely against possible movement from cable pulling operations. The total amount of duct laid for light, power, and telephone requirements is 424,000 linear feet (3,600 trench feet), and the average cost was 19 cents per duct foot.

The manholes, of which there are 150, are of timber construction, and the only novel feature of design is the small box extension fastened to the sides, into which the ducts terminate. This box enables the cable bends to be started some distance outside the manhole proper, and admits of the manhole being made smaller than with standard construction.

For telephone service, 2 inch black iron pipe, with burrs reamed, is used, this size of pipe being adopted to withstand the activity and indifference of excavating gangs.

In order to arrive at an estimate of the number of subscribers' lines, independent studies were made of each section of the grounds by the engineer of both the Pacific Telephone & Telegraph Company and the Exposition, due consideration being given to the area of each section, the number of buildings or booths it contained and the class of business which might be expected to originate therein. As a result of these investigations it was decided to prepare for handling 1,000 lines and at the same time to lay out the underground system with the view of increasing the plant at the least expense in case the number of subscribers should be materially greater than originally estimated. Each cable has been run to the approximate center of each section and terminated in a cross-connecting box from which feeders are run to other centers within the section. From the feeder cables, twisted pairs are run in rings along the exhibit building trusses or

Duct Line Before Buildings Were Started.

Typical Duct Line.

Wooden Manhole and Ducts.

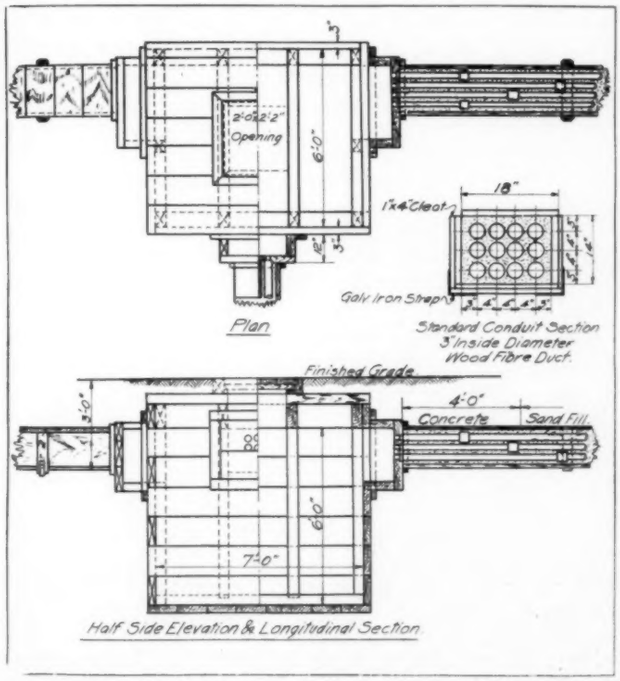
under the floors of the buildings to their terminals.

The method of distribution is such that it is not necessary to take multiples off cables, and the cables are pulled through several manholes without splices. The advantage of this procedure is that short lengths of cable are avoided and the salvage value of the system will be high. It is expected that the use of cross-connecting boxes will permit of the maximum fill in the main cables.

In the states and foreign sites, where there are some 200 buildings scattered in an area of ½ square mile, a large cable has been looped into several of the larger buildings and cross connections made to feeder cables for other important buildings. Where the service requirements do not warrant a cable to a building it is connected, by means of weatherproof wires, to the nearest buildings connected to a feeder cable.

In the Zone the concessions buildings are located on one long street and subscribers are connected with weatherproof wires running in rings along the backs of buildings and fences and terminating in feeder cables, which in turn are fed into the main cable handling the district.

The underground system has required 41,000 feet of cable, of which 4,500 feet is 400 pair. The trunk line connecting the Pacific Telephone & Telegraph Company's system with the Exposition's exchange, has a capacity of 1,200 pairs. The central office is located in the Food Products building and covers an area of 2,400 square feet. The switchboard is made up of 5 sections, or 15 positions of A. T. & T. Co. standard No. 1 type switchboard and includes a complete storage battery plant with charging generator and ringing machines. In addition to the main board there is a No. 8 chief operator's desk and a 4-position information desk. The switchboard is equipped

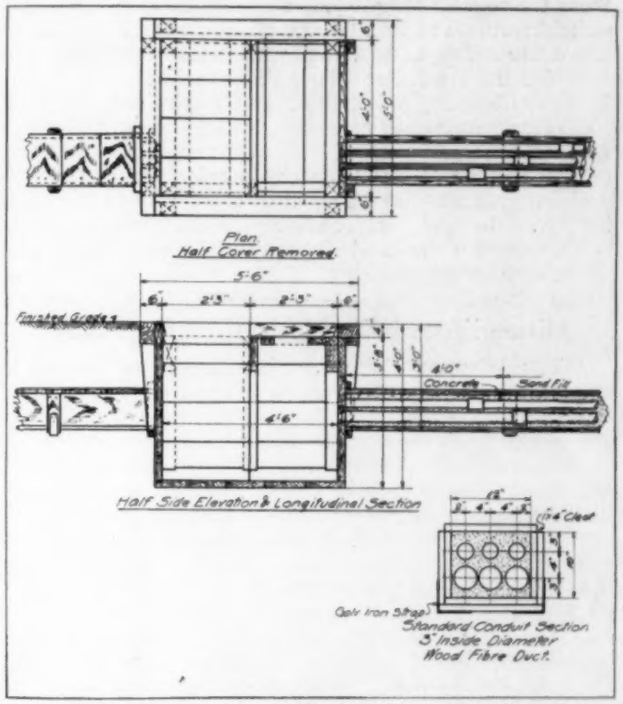


Exposition Standard Conduit and Manhole Construction Where Ground ***Water is Not Encountered.***

with 6-panel multiple and auxiliary answering jacks. It will also have 200 incoming and 60 outgoing trunks.

The operators' rest room is of standard construction and contains all modern conveniences.

To care for the needs of the public and those participants who do not have telephones, 36 attended pay stations will be installed. One of these stations is to be located in each of the exhibit palaces, and the balance



Exposition Standard Conduit and Manhole Construction Where Ground Water Is Encountered.

will be located at points selected to best serve the needs of the public. At these stations the public can be connected direct with the system of the Pacific T. & T. Company and its associated companies. These stations will also be used as registration and information bureaus, and ten-word messages, in the form of a telegram, will be received, registered at the main office and delivered at any of the pay stations to the party calling for them in the name of the addresses. These messages will be handled at the main office by special operators at the information desk.

The equipment of these stations will consist of from 5 to 10 booths, according to the location, wired to standard No. 4 switchboards. The booths used at these stations were designed by the Exposition, and are built as units. They are made of surfaced tongue and groove lumber and have an air space of 2 inches between each partition. The booths are somewhat smaller than standard, and are equipped with wall sets attached to the side of the booth so that a party can close the door and use the telephone without having to make a complete turn of the body.

Present indications are that a large number of private branch exchanges will be required by the larger state, foreign and concessions buildings. On account of having all incoming calls to the Exposition terminate on the main switchboard, special arrangements have been made with the Pacific T. & T. Company to have all trunks on the Exposition switchboard terminate at its West exchange. Incoming calls will terminate on ringdown answering jacks on the Exposition switchboard and will be answered and distributed by local numbers.

The outgoing calls will be handled over out trunks

and answered at West exchange on regular answering jacks and distributed to the various offices in the usual way.

The long distance calls will be trunked direct to and from the regular long distance Pacific T. & T. Company switchboard. The first two positions on the Exposition's board are arranged to handle this class of service. To care for the trunks and long distance lines, the Pacific T. & T. Company is installing a 400 pair cable for local trunks and a special composite cable for long distance trunks.

In order that the telephone service within the Exposition grounds may be equal in every way to the service given by the local company, arrangements are in effect whereby the local company will supply the Exposition with all its operators.

Missouri Association Holds Third Convention

The Missouri Telephone Association held its third annual convention at the Coates House, in Kansas City, December 9 and 10. It is claimed that this meeting was the largest convention of telephone men ever gathered in Missouri, over 300 in attendance. The parlor floor was devoted exclusively to the association's headquarters, including many exhibits.

President Houck McHenry, Jefferson City, Mo., opened the convention and was followed by G. H. Forsee, industrial commissioner of the Kansas City Commercial Club, in an address of welcome.

An address outlining the work of the association, impressing upon the members and guests the advantages of co-operation and a united stand in building up the association along broad lines was then delivered by President McHenry.

Following an interesting paper on "Telephony," by J. C. Kelsey, W. W. Johnson, secretary of the association, read a report showing the organization to be progressing rapidly. The report gave out the information that Missouri has approximately 500,000 telephones in operation, 1,240 exchanges, and the general industry employing a total of 9,500 persons—5,000 females and 4,500 males.

Special consideration was presented to the favorable relations existing between Missouri telephone companies and the State Public Service Commission, in that during the past year practically all rulings and regulations were satisfactory both to the public and the telephone companies without the necessity of a single reversion to court proceedings.

Wednesday evening a banquet was held with 200 in attendance. Dr. S. T. Neill presided. The diners were entertained during the banquet with popular selections from cabaret singers.

The Thursday morning session opened with an address by Mr. Woolf of the Jovian Order, giving the history and nature of the society and offering the co-operation of his organization in any matters the association may need assistance upon.

The subject of war tax requirements was then discussed comprehensively by F. B. MacKinnon, secretary of the National Independent Telephone Association.

A lecture on "Storm and Flood Damage," by W. O. Pennell, illustrated by stereoptican views, followed and furnished extraordinary interest in that the views depicted telephone equipment in use in China, Paris, Korea and many other foreign cities. Among the views shown were scenes of storm and flood damages to telephone poles and lines in various Missouri cities during the last severe storm season.

The afternoon session began with an address by G. M. Hunt, of the United States Department of Agriculture at Madison, Wis. Mr. Hunt's subject was "Wood Preservation," various processes and results arising from treated poles being illustrated by a series of interesting stereopticon views.

J. M. McShane, chief accountant for the Missouri Public Service Commission, followed with an excellent talk on accounting systems and reports as required by the Missouri commission. Special emphasis was laid on the suggestion that telephone companies establish a uniform method of bookkeeping whereby the commission could obtain accurate financial statements.

January 5, 6 and 7 at Topeka was next announced as the time and place of the Kansas Independent Telephone Association.

Committee of Rules and Regulations were next presented, followed by the election of officers, which are as follows: Houck McHenry, president; A. B. Clarke, treasurer; G. W. Schneer, membership secretary; W. W. Johnson, secretary. The executive committee includes J. A. Hudson, C. J. Meyers, H. C. Todd, C. W. Boutin, M. L. Golladay, Dr. S. T. Neill, G. V. Ross, W. H. Bassett and R. A. Guthrie.

Many interesting exhibits were displayed at the convention and the large attendance of manufacturers showed a splendid convention enthusiasm.

South Dakota Independents Convene

The South Dakota Independent Association chose the Hotel Carpenter, Sioux Falls, as the headquarters of its twelfth annual convention held December 16, 17. Sixty telephone men from various parts of the state attended including members of the South Dakota State Commission.

The meeting was called to order by L. M. Gibbs, secretary of the Sioux Falls Commercial Club. President Steninger responded with an excellent address on association benefits and influence. Guy H. Pratt, of the Omaha Northwestern Telephone Company, followed with a comprehensive discussion on government ownership, citing various instances of foreign government's figures on the cost of telephone service. In each instance these costs were much greater than present costs existing in the United States.

The morning of the second session opened with an address on "Public Regulation of the Telephone Business," by P. W. Dougherty of the South Dakota Railroad Commission.

"Uniform System of Accounting," by T. E. Cassill, was next delivered during the afternoon session. Mr. Cassill urged all telephone companies to establish a system whereby each department could show its profits or losses.

Following this address election of officers took place; the results were as follows: J. A. Steninger, president; H. P. Hartwell, vice-president; A. S. Hall, secretary-treasurer. The executive committee included B. M. Ryan, J. Wilson, J. A. Steninger, A. S. Hall, R. E. Cameron, E. C. Kast and C. B. Miller.

The association's annual banquet was held at 6 o'clock. After the banquet the members were guests of the commercial club at a theater party.

Telephone Talks

The First Installment of an Instructive Serial Course for all Telephone Workers

BY G. W. CUMMINGS AND ARTHUR KNEISEL*

THE Technical Club had been called to order and the minutes, old and new business were disposed of in the usual manner, when the President called for any questions concerning the work accomplished since the last meeting. The Installer's Helper, who had just joined, took the floor.

"I have not been in the business very long and daily hear terms and expressions used that are Greek to me, and often questions are put to me that you can search me for the answer without much chance of finding it. No one has ever explained any of them to me and I'd like if some one here would put me wise to some of the dope that seems so simple to you fellows that you think everybody knows it without being taught."

"If you will put your request in a more concrete form," said the President, "we will endeavor to find an answer for you. Ask us some definite question."

"Well, for instance, tell me just what is done when a telephone is in trouble, from the time it is reported until it is finally O. K., and if you use an expression that I don't understand, I'll butt in and say so."

"From the nature of your query, I think we had better listen to what the Tester can tell us concerning it," said the President.

Expecting a rather lengthy story, the members settled themselves into more comfortable positions, borrowed the "makin's" from the Secretary and a light from a convenient neighbor. The Repairman, who had struck an unusually liberal subscriber that day, even had a few cigars to pass around as far as they would go.

"Well," began the Tester, "a case of trouble may originate with the traffic department as a 'permanent,' that is, a signal on a subscriber's line when the line is not in use; a 'don't answer;' 'can't hear; 'can't be heard;' 'repeated nickel signal on deposit (or return);' or 'no nickel signal.' These are a few of the complaints picked up by the operators on the 'A' board."

"What's the difference between the 'A' operator and the 'B' or 'C' or 'D' operator?" asked the inquisitor.

"Our discussion refers to a telephone system in which there are several exchanges, or, rather, units. In such a system, the 'A' operators are those who answer the subscribers' calls, return or more often cash their nickels, supervise their calls, and restore the signaling apparatus to normal when conversation is ended. The 'B' operators are those who actually connect the calling subscriber with the party he is calling, after the 'A' operator has repeated to her, the number wanted. The 'B' operator can never talk to a subscriber. So far we have no 'C' or 'D' operators."

"For which, let us be thankful for small favors," murmured the Switchboard-man.

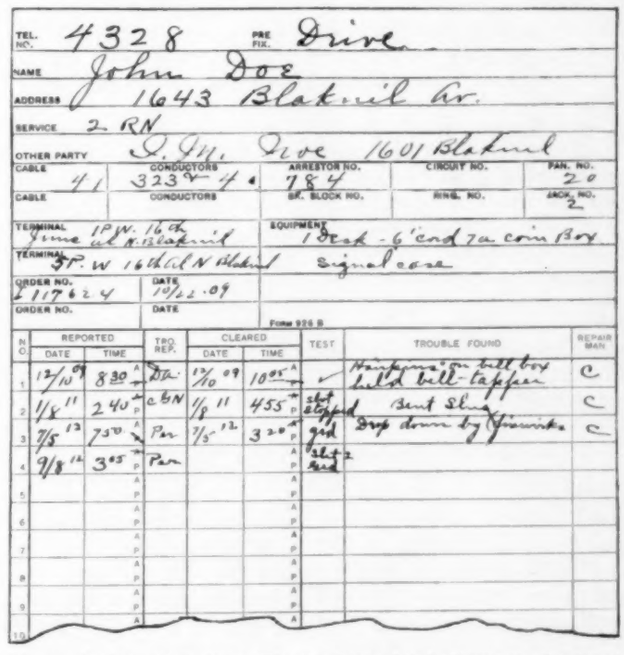
"Do you mean to tell me that the 'A' operator must repeat every number given by the subscriber, to the 'B' operator? Don't that introduce a big chance for errors?" interrupted the Helper.

"Yes, it is undoubtedly the weakest point of our present practice of handling calls. There is the chance of the subscriber's transposing the digits of the number he is calling, depending on his nationality; the chance of the 'A' operator's misunderstanding the number or her transposing it (a much rarer occurrence); the chance of the 'B' operator's transposing, misunderstanding or plugging in the wrong multiple; or, if two operators are in on the same call circuit at the same time, the wrong one may get the trunk assigned. Working at the high speed at which a 'B' operator must during the busy hour it is easy for her to miss the right multiple jack and plug into one above, below, or on either side of it. Considering the immense number of calls handled in a day, the number of errors made by the operating force is remarkably small. We can adjust a relay or other apparatus to perform a certain duty and assume that it will act the same under like conditions, but so far we have found no way to cope with the human element of the equation with any degree of certainty.

"In the case of a 'permanent' the 'A' operator gives the hospital operator the number of the line, or one of the parties on the circuit if a party-line is involved, to be 'plugged up' in the hospital until the trouble has been cleared."

"Just a minute," broke in the Installer's Helper, "what is the 'hospital?' Is it a repair shop where instruments are overhauled and repaired?"

"No, not quite," explained the Tester. "This is somewhat the reverse of a hospital in the medical profession. Here, instead of having an operating room in the hospital, we have the hospital in the operating room. It is a position, usually in the 'B' board, equipped with special apparatus to enable the operator to supervise any lines that are in trouble so that a subscriber's service will be restored as quickly


TEL. NO. 4328 PRE FIX. Drive
NAME John Doe
ADDRESS 1643 Blaknil Av.
SERVICE 2 RN
OTHER PARTY S. Jn. Dove 1601 Blaknil
CABLE 41 CONDUCTORS 323 4 ARRESTOR NO. 784 CIRCUIT NO. PAN. NO. 20
CABLE CONDUCTORS BK. BLOCK NO. RING NO. JACK NO. 2
TERMINAL Jume 1PW. 16th Blaknil EQUIPMENT 1 Desk - 6' cord 7a coin Box
TERMINAL 3rd. W 16th at N Blaknil signal case
ORDER NO. 117624 DATE 10/22.09
ORDER NO. DATE
Form 926 B

NO.	REPORTED DATE	REPORTED TIME	TRO. REF.	CLEARED DATE	CLEARED TIME	TEST	TROUBLE FOUND	REPAIR MAN
1	12/10 09	8 30 A	Da	12/10 09	10 05 A	✓	Hanging on bell boy Left bell-tapper	C
2	1/8 11	2 40 P	cbN	1/8 11	4 55 P	shot stopped	Bent Slug	C
3	7/5 12	7 30 A	Pan	7/5 12	3 20 P	grd	Drop down by Jumper	C
4	9/8 12	3 05 P	Pan		A P	2Lt 2 grd		
5		A P			A P			
6		A P			A P			
7		A P			A P			
8		A P			A P			
9		A P			A P			
10		A			A			

Fig. 1. A Subscriber's Card—The Numbered Blank Spaces are Continued on the Back of the Card, the Numbers Running to 19 on the Front and Up to 50 on the Back.

*Copyright, 1915, by G. W. Cummings and Arthur Kneisel.

as possible after repairs have been made. Sometimes the hospital operator also answers all calls for a certain group of numbers, such as the 12000 group, acting as a private branch exchange operator for that exchange. She likewise tests with repairmen and installers and is often the information operator. A line is 'plugged up' by inserting in its multiple a plug having tone-test or trouble tone on its sleeve or third wire. This is to inform any other 'B' operator testing the line for busy that the line is out of order, so she can notify the 'A' operator by means of a special signal and the calling subscriber need not get a 'busy' repeatedly, but can be told that the line he wants is out of order. On 'operator first' lines, that is, the ones which get an operator without first depositing a coin, which are reported 'permanent,' the operator throws the 'howler' on the line to attract the attention of any subscriber who may have left his receiver off the hook, and thus gets him to clear the trouble by replacing his receiver. This howler is a high-pitched tone which I hesitate to term musical. 'Permanents' are held for half an hour during the day and if they do not come clear in that time, they are referred to the repair-clerk by memorandum, but are kept plugged until cleared. As soon as they are cleared, the hospital operator gets a clearing-out signal and removes the trouble cord and plug, thereby restoring the line to normal. A record is kept of all 'permanents' which 'came O. K.' in the hospital and if lines show this record repeatedly, an inspection is made.

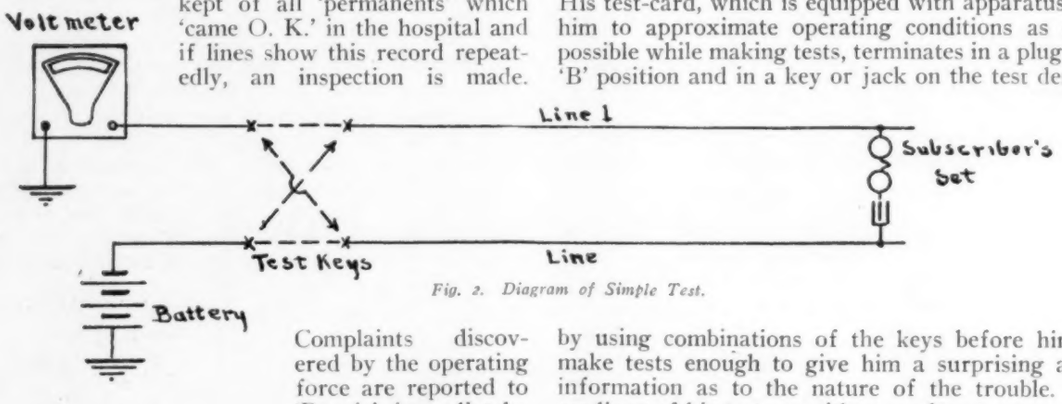


Fig. 2. Diagram of Simple Test.

Complaints discovered by the operating force are reported to 'Repair' immediately. Such reports as originate with the subscriber, among which are receiver or mouthpiece broken, wire broken, can't raise operator, nickel falls through, etc., go to the repair-clerk direct, the subscriber being given the opportunity to tell his tale of woe to her whenever possible.

"When the repair-clerk gets a complaint, she extracts the subscriber's card for the line reported from the file while she is still taking the complaint and inserts a tracer card in its place. This insures her not forgetting to make a note of the complaint and furnishes a check as to what cards have been removed from the file, for the tracer cards are longer and project above other cards. She enters the date, time and a code for the complaint on the subscriber's card and then enters the telephone number in its proper place on her check-sheet and passes the card to the tester whose desk is conveniently close to hers. The object of her check-sheet is to avoid duplication of complaints and to enable her to inform a subscriber immediately whether she knows a line is out of order or not. It also serves as a check on the maintenance department until the trouble has been repaired. Perhaps the Maintenance-clerk here will give you a sketch of a subscriber's card."

"Sure, that's easy for me," said the M-clerk, "I make my living writing out those cards and trying to keep their records straight. There you are. (Figure 1.) You will note that it gives about all the information concerning a subscriber that any employe of our company could call for; the panel and jack number for the switchboard-repairman; the cable conductors for the jumperman; the trouble record for the wire chief and the repairman and even the order number for the contract agent. It gives a complete and detail life history of the line, and by means of this card a trouble record can be compiled for the collection department on very short notice in case of a disputed bill."

"Subscriber's cards," continued the Tester, "are stacked on the tester's desk in 'theatrical order'; that is, the order in which they are received, newcomers being placed at the bottom of the stack, so that no preference is shown to complaints except to a very few lines, such as those of the fire and police departments, and these cards are stamped with a red star to indicate their importance.

"The tester, in glancing over the card, must notice primarily the class of service, for from this he knows what results to expect if the line is O. K. Second, he must notice the style of the equipment, as this has considerable bearing on the test. While he is ordering the line on a test cord, he is comparing the trouble reported with the past history of the line as shown on the card. His test-card, which is equipped with apparatus to enable him to approximate operating conditions as closely as possible while making tests, terminates in a plug in the last 'B' position and in a key or jack on the test desk, where, by using combinations of the keys before him, he can make tests enough to give him a surprising amount of information as to the nature of the trouble. He gets readings of his tests on either a voltmeter or an ammeter from which he can estimate the distance between the exchange and the trouble.

"Now, to forestall an interruption, I will briefly explain the principal difference between a voltmeter and an ammeter. It is that the former has a high resistance coil and a scale graduated to indicate the drop in electrical pressure across its terminals, while the latter has a coil of low resistance and a scale graduated to read the amount of current passing through it. While the tester often calls one of his measuring instruments the ammeter, he really uses a milliammeter, which reads in thousandth parts of an ampere or milliamperes. After you have a better understanding of the work, we may spend an evening to good advantage in discussing the principles and construction of the various instruments used in connection with a telephone exchange.

"I will make no attempt to give you more than a sketch of the simplest kind of a complaint, a permanent signal on a flat rate line, and after you have absorbed a little more of what you hear daily, you will be better prepared to ask questions on more difficult ones. To begin the test, the tester depresses a call-circuit key which bridges his talking set direct on that of the 'B' operator who has his test-cord in her position, and orders up the number to be tested, thus: *'Drive 51 on the two cord,'*

the number of the cord referring to the specific cord he wishes to use. The 'B' operator inserts the plug of the cord in the multiple of the telephone number ordered up and replies *'on two'* to signify that she has complied with the order. Releasing the pressure from the call-circuit key, the tester disconnects his transmitter circuit from that of the operator. He then inserts his volmeter first into one side of the line and then into the other to test for ground, one side of his voltmeter being connected to ground. I will draw this circuit on the blackboard for you. It is very simple and you must learn to read circuits anyway if you intend to get anywhere in this work. (Figure 2.)

"If the line is clear, he will read only a metallic condenser, that is, he will get the same 'kick' or deflection on his voltmeter when he charges and discharges the line from the office battery—out over one side of the line, through the ringers and condenser at the subscriber's set, back over the other side of the line through his voltmeter to the office ground—as he will get when he reverses the line and charges over the opposite side of the line out to the instrument and then back to ground. Normally, the condenser at the subscriber's instrument is discharged; that is, has no current stored in it. As soon as a current circuit is closed on the line, it is 'charged;' that is, its electrical pressure is raised to the voltage of the exchange battery. Now, if the exchange battery is taken from the line and the line is left open, the condenser will retain this charge until it leaks away. If, however, the line is short-circuited, this charge will be neutralized quickly; or, if current is sent out on the line in the reverse direction, it will be neutralized and charged in the opposite direction. Should the line show 'clear out' the tester will next determine whether it is clear and O. K. 'in' (inside the exchange), by opening the third wire of his testing circuit and connecting a shunt coil across the cord to pull up the line relay of the line under test just as it would be pulled up by the subscriber in making a call. This should raise the subscriber's operator and prove whether the right line is being tested, or whether there is any abnormal condition on the signaling apparatus in the office, before the subscriber is called to question him as to whether he has experienced any trouble. Assuming, however, that the tester does not get the metallic condenser kick, but reads battery and ground on his line; this often indicates that there is a switchboard cord in a multiple of the line in addition to his test-cord. He immediately tests the line for busy and tone test and should he get the latter, he immediately goes in on an order-wire to the hospital and orders the line 'down;' that is, requests the hospital operator to remove the trouble cord; but if the line is busy, according to his test, he can raise the operator by grounding the third wire of his test cord, thereby releasing the cut-off relay and pulling up the line relay of the line under test, and he can request the operator to take down her cord. Occasionally he may have to call for a supervisor to find where the line is up on connection before he can get it clear of the cord ground and battery so that he can proceed to test for a ground, a short-circuit, cross with battery or an open."

"Just a minute, Mr. Tester," said the Installer's Helper. "I know that it is necessary to have either two wires or one wire and a return ground to make a complete circuit, and that an 'open' is caused by an actual break in the circuit, but will you please tell me the difference between a short-circuit, a ground and a battery-cross?"

"A 'short-circuit' is the shunting of the current through a path not called for under standard operating conditions of a circuit and may range from a 'slight short' to a 'heavy short,' depending upon the resistance of this path. A 'ground' is the shunting of current from either side of a circuit to earth, and if both sides are shunted to earth at the same time, it is termed a 'short to ground.' A 'battery cross' is, as the name implies, a contact with current foreign to the normal conditions of a circuit, that is, the line in question is touching a conductor carrying battery.

"A 'short' is read easily in testing by connecting the line through a milliameter—or, as we call it, 'the milli'—and battery, and noting whether the deflection shown is the same upon reversing the line. Considering the speed at which our testers must work, a fairly good estimate

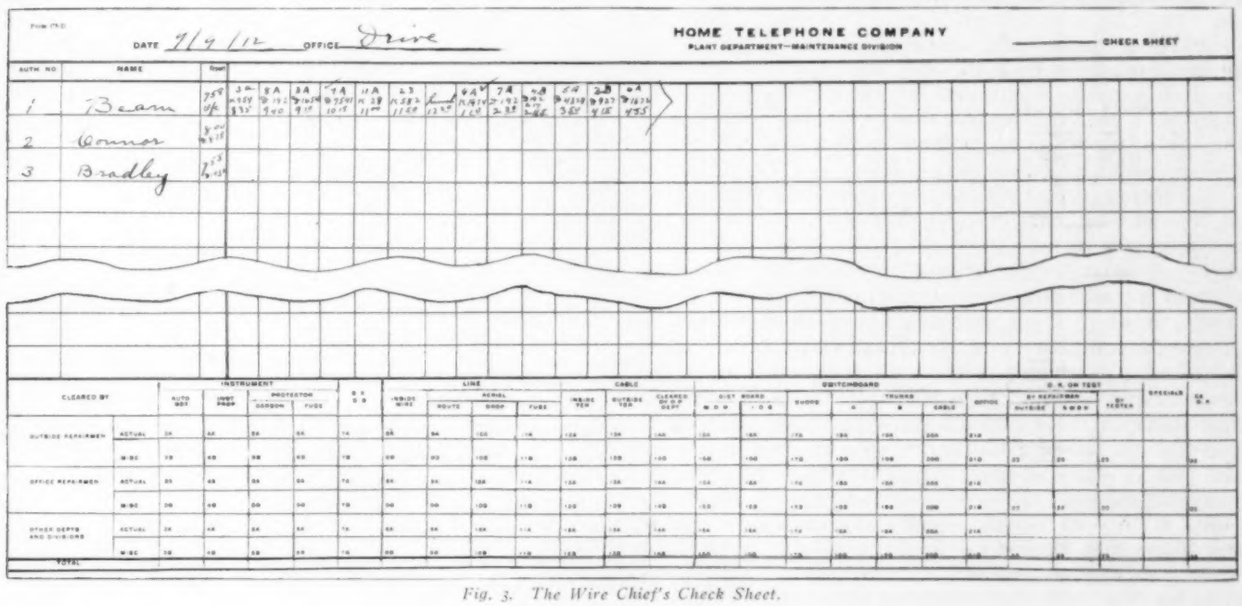


Fig. 3. The Wire Chief's Check Sheet.

as to the nature of the short can be made by the number of milliamperes it draws, a short condenser drawing about ten, a receiver short (receiver off the hook) between fifty and seventy-five and an actual cross in the line proper as high as two hundred and fifty, depending upon its nearness to the exchange and the resistance of the point of contact. A ground is read by noting the deflection obtained on a voltmeter upon connecting it in series with the office battery on one side, the other side being connected first to one side of the line and then to the other. The heavier the ground, the greater will be the deflection on the voltmeter. Knowing the resistance of his voltmeter and the voltage of his testing battery, he can estimate the resistance of the trouble and also its distance from him; but as I do not wish to frighten you unnecessarily, I will refrain from discussing this tonight. In testing a battery cross, the tester connects one side of the voltmeter to the office ground, and the other side of the voltmeter, first to one side of the line and then to the other, depending upon the foreign battery to give him a deflection. It is seldom that he gets a metallic battery cross which is not grounded. If this should happen, he can read it by connecting the voltmeter to both sides of the line.

"We will assume that the line under test has shown the same deflection on both sides, being short to ground. The tester indicates this in the proper column on the subscriber's card and passes this to the detailing tester, who files it according to address in that repairman's file in whose district it falls.

"This detailing tester is often termed the 'wire chief,' but he would be more properly named if called the goat. It is his duty to parcel out the work to the repairmen and to supervise them. He must have a detail knowledge of every repairman's district, particularly every street therein, so as to know immediately which repairman is to clear a complaint and the rotation in which complaints must be given to repairmen in order to make the most efficient showing for the day's results and to avoid great delay in the clearing of any one case. He must supervise the work of seven to ten men in times of calm and as many as thirty during storms. His records must be sufficiently accurate and complete to recall the details of a case of trouble, weeks and occasionally months after it has been cleared. He must exercise judgment in deciding the best course to be pursued by the repairman who may feel inclined to side-step responsibility and he must take the latter's word for existing conditions and everyone's blame in case he makes an error. He keeps a check-sheet before him on which he enters much information, so that he knows at a glance how many cases each repairman has cleared, the telephone number, the time cleared, the kind of trouble (by code) and whether a carfare was used in clearing it. He must get the maximum amount of work from his men with minimum or rather no friction, for he is there to get work done economically and not to quarrel. Often he must keep special records relative to trouble of a certain class in addition to all this. Naturally he soon becomes adept at using both hands simultaneously but irrespective of each other, and soon learns to recognize a voice with the first syllable spoken. Before the second word is spoken he has the proper subscriber's card out of its rack and is ready to record the facts of the trouble—and not to as great extent as is usually reported by repairmen, for that would require a card per complaint, and he is supposed to get all the information on one line in ordinary cases. So you see he must also be an editor. In fact, he is to the telephone system all that the train dispatcher is to a railroad system.

"I have given you this discourse, Mr. Helper, in the hope that when you become a repairman, you will remember a little of this talk and learn to give vital facts in as few words as possible and to get away on the next case. Considering all that is expected of detailing testers, it is surprising that more of them do not suffer nervous breakdowns or take to drink.

"Here is an illustration of the check-sheet he keeps and I will give you a short description of how it is kept, assuming that the repairman is now working on the case of trouble which we have tested and he can later tell us how he cleared it. (Figure 3.)

"You will note that the caption gives the date and office or exchange; the first column gives the authority number under which he is working; the second gives his name, and the third is used to show the time and place from which he reports, while the columns thereafter are used to show the trouble he clears. Frequently when a repairman reports, the detailing tester asks him to stay there until called, or while he is momentarily holding him on one line, the detailing tester will order the line, over which the repairman claims to be reporting, up on his test cord. This is done to check on the repairman to prevent his wandering from the district assigned to him. For a repairman to be caught outside his district during working hours, is the most unpardonable offence that a detailing tester can commit."

"See here," interrupted a repairman, "I only tried that once, so you need'nt rub it in now."

"Please don't interrupt. If your feet hurt, consult a shoedealer. As a repairman clears a case of trouble, its telephone number is entered in the square opposite his name with the time of O. K. under it and the code number of the complaint over it; for instance, if the repairman found instrument trouble such as a broken switch-hook, he will indicate this fact by placing a small *3A* over the number. Now, if the repairman used a carfare in traveling from the previous complaint to this, a red checkmark is placed over the telephone number provided the distance was one mile or over."

"Why a red checkmark and not a black one?" inquired the Helper.

"I don't know exactly," replied the Tester, "unless it is a danger signal that a sufficient number of such marks might bankrupt the company and that he should route his trouble more economically."

"What is the purpose of these squares in the space at the bottom of this sheet?" was asked.

"Those are used at the close of the day to total the work of all the repairmen under the various classes of trouble, by means of tally marks and to check with the repair clerk to prevent the loss of any complaint in routine. Each evening every subscriber's card handled that day must be accounted for and the records of the repair clerk and the detailing tester must agree as to the number of cases reported, and the number carried.

"I purposely curtailed the description of the test to simplify it, for we will, no doubt, hear more questions from you after you have learned something more of the operation of a line under standard conditions."

"Since the company is opposed to our working overtime," chimed in the Repairman, "I think we ought not to try to clear this case tonight, and as it is now 10:30 p. m., I move that we carry the case until next meeting and that we adjourn." Seconded and carried.

(To be continued)

All Ready For the Convention at Minneapolis

Independent Telephone Association of America Anticipating Big Attendance

BY W. S. VIVIAN

PROGRAM and other arrangements for the coming convention in Minneapolis, January 19, 20 and 21, are well under way and promise a particularly attractive event.

The exhibits are to be unusually large, varied and interesting.

The program, as outlined by the Program Committee, offers many subjects for consideration and discussion. They deal with the financial and operating questions—questions that telephone men have to face every day.

The two largest utilities commissions in this country are to be represented in the program—the Interstate Commerce Commission and the Wisconsin Railroad Commission. The one has for a subject "Accounting," and the other "Switching Rates."

The subject of "Accounting" is an especially live one at this time, as the Interstate Commerce Commission has recently prescribed the requirements for Class "C" companies. This means that practically every telephone company from now on will be obliged to keep its accounts as prescribed by the commission.

President E. B. Fisher.

The subject of "Switching Rates" is one on which there is a wide divergence of opinions, and one that every manager who has rural lines which are owned by the farmers themselves has to face. The Wisconsin Railroad Commission has probably made a more exhaustive study of it than any other body in the world.

The gentlemen representing both of these commissions will say many things that all telephone men ought to hear.

C. E. Randall, on "Tactics of the Opposition," will give independent telephone men some things to think about that are of vital interest to business, and which they should know about, especially those who wish to remain in the business.

H. E. Bradley, on the subject of "Cross Purposes," will tell about some of the ridiculous, deplorable and inefficient methods which are now generally practiced, which will be a revelation to many, even those who are perhaps, in a measure, responsible for these present practices.

J. C. Casler of Texas, on the subject of "Our Association—How It Can Be Strengthened and Made More Valuable," will have some suggestions to offer that should be put into motion immediately so that they may be realized.

Secretary W. S. Vivian.

J. C. Kelsey, on "Financial Organization," will have some suggestions to offer showing the tremendous need of an organized body which will undertake to bring telephone companies who need additional money for development purposes into touch with investors.

Thomas W. Hicks, of Minneapolis, under the subject of "Some Do's and Don'ts of Advertising—By an Advertiser," will tell how telephone companies can do a great deal of effective advertising without spending a great deal of money.

"Some Applications of Theory to Telephony," by Prof. G. D. Shepardson of the University of Minnesota, will prove effective and interesting, as Prof. Shepardson is at the head of the Department of Electrical Engineering.

On Thursday afternoon Prof. Shepardson will also give at the university a number of stunts in the electrical laboratory that will be of interest to all of those who can attend.

The question of physical connection is now in the courts in two states, and there are a number of states that have physical connection. Hon. Frank Winter, of La Crosse, Wisconsin, who has been present in the La Crosse physical connection cases, will address the convention on that subject.

At the time of writing this nearly all of the rooms at Hotel Radisson for exhibiting purposes have been engaged, and the exhibitors are co-operating with us in the effort to make the exhibits the largest and best ever shown. The many improvements in equipment which have been made during the past year or so will make these exhibits decidedly interesting and valuable.

Wednesday night will be the occasion of the annual banquet. The program committee has been able to secure George E. Vincent, president of the University of Minnesota, whose subject will be "The Organization of the Social Mind." Dr. Vincent is said to be one of the most brilliant and interesting speakers of the middle west.

In conclusion we can only say that it is not a question of whether or not you can afford to go. You cannot afford to stay away. There can be no question that the expenses incidental to attendance at this convention will be the best investment that your company can possibly make, as the vision you will get of the telephone situation in this country, and the ideas you will get that will enable you to operate more effectively, will repay you and your company many times over for the time and expense in attending once in every twelve months.

Hon. E. B. Fisher of Grand Rapids, Michigan, the

president of the Association, will preside throughout the several sessions. The address which the president will give will be one of intense interest. We presume that Mr. Fisher has assisted in organizing more independent telephone companies, and is personally known to more telephone men and independent telephone investors, than any other man in America. Mr. Fisher has been extremely active in telephone work from the beginning of competition up to the present time.

For the convenience of those who live south and east of Chicago, and who will come via Chicago en route to Minneapolis, we have arranged for a special train via the Burlington route, and we would strongly urge that reservations be made for this train at your earliest convenience, and in addition we would urge that you make your reservations with H. C. Buckner, assistant manager, Hotel Radisson, Minneapolis, at the earliest possible date, as other associations will be holding conventions in Minneapolis on the same dates, January 19 to 21, and you can only be sure of getting a room upon your making your reservations early.

Postmaster General Asks Government Ownership

Asserting that for the first time since its organization by Benjamin Franklin, the Post Office Department is on a self-sustaining basis, Postmaster General Burleson submitted to President Wilson his annual report. It records enormous growth in the department's business because of the parcels post and postal savings bank divisions, and recommends a program of postal legislation to increase the scope of the department's activities.

Mr. Burleson features his report with an estimate that a surplus of $3,569,545, the second of his administration, will be shown for the fiscal year of 1914 when all claims and charges have been met. On that showing he bases his declaration that the department has been securely placed upon a self-sustaining basis.

The report adds that unless unusual conditions should arise, resulting in abnormal depression of business, there is no danger of recurring deficiencies.

The legislative program recommended is as follows as to its most important features:

Early action toward government ownership of telegraph and telephone lines and immediate taking over of these systems in Hawaii, Alaska and Porto Rico.

Reviewing his recommendations for government ownership of telegraph and telephone lines, Mr. Burleson states that he renews the recommendation embodied in the last annual report that Congress seriously consider the question of declaring a government monopoly over all utilities for the public transmission of intelligence, and that steps be taken as soon as practicable to incorporate into the postal establishments the telegraph and telephone systems of the country.

In that report reference was made to the anomalous condition in this country under which the telegraph and telephone utilities, being vehicles for the public transmission of intelligence, infringe upon a function reserved by the constitution to the national government. They inherently, as well as constitutionally, belong to the postal service. The firm conviction of the department is here reiterated that telegraph and telephone service is inevitably monopolistic, and, when operated under private control, does not render the maximum of public service at the minimum cost to the whole people.

It is an interesting fact that, whereas policies of government have been advocated and some adopted, the constitutionality of which have been seriously questioned, the principle of government ownership and control of the telegraph and telephone finds its greatest strength in the constitution. This opinion has been shared by practically all postmasters general of the United States, who have held that the welfare and happiness of the nation depend upon the fullest utilization of these agencies by the people, which can only be accomplished through government ownership.

Giving the "Dope" to the Commission

While accustomed to unique complaints on all matters of rates and service of railroads and public utilities, the Wisconsin Railroad Commission received the most novel document in the form of a grievance for investigation that has ever been received. It is written by a farmer in northern Wisconsin against the rural telephone company that furnishes him service. Except for the omission of the name of the writer of the letter and the name of the telephone company, the letter follows:

Railroad Commission, Madison, Wis.

Dear Sir: The ——— Telephone Company is one old long drunken Norwegian. He shpends his money getting drunk. He is drunk every day if he can get it. His poles are rotten and fall down. He makes the excuse that the storm blows his line down. I told him that I would give you a description of the ——— Telephone Company.

It is a Norwegian thing about six foot one inch long; stay around the saloons of ———, Wis., mostly, gets drunk every day and stays drunk and saucy. He bulls every one of his patrons. Often it is three or four days you hear nothing. The last time about one week ago he submit his bill. I wrote on the bill that when he put the line in repair he would get his pay. He has not been round since. I heard that he was somewhere taking mud baths. It seems that there is a place where they bury up drunks in the mud and leave them for a week. That draws the whiskey out and they return again for a new drunk. I pretty near forgot to tell you that the ——— Telephone Company is ———.

(Signed) ——— ———

Because of other complaints against this same company an investigation will be made of the service furnished and an order will probably be entered requiring any needed improvements in service.

Indianapolis Telephone Companies Ask Merger

Another step has been taken to forward the movement for one telephone system in Indianapolis, when the city's corporation counsel filed with the Public Service Commission a petition to compel the Central Union Telephone Company and the Indianapolis Telephone Company to make physical connections. If the petition is granted, one telephone service will be a reality, because even though there may be no merger of the companies, anyone having one telephone connection may talk with persons on lines of the other company.

The petition says each company has a central station with thousands of telephone connections, but only a small number of persons have both telephones. It says if a physical connection is made, persons may use either telephone on the payment of a reasonable toll. Even if the commission permits a merger of the two companies, it will be many months before the consolidation is effected and during that time the people should have the advantage of one system. No date has been set by the commission for hearing the petition.

It has been expected for some time the commission would begin consideration of previous petitions for a merger of the two companies or for the establishment of a rate system based on the measured service basis.

Operating Efficiency in Indiana and Michigan

How Independent Girls of Two States are Improving Service

Pioneering as a Long Distance Operator

By Agnes Smith, Chief Operator, Fort Wayne, Ind.

WHEN it was suggested to me that I write about my experience as toll chief I at first demurred, not wishing to go on record with the claim of being one of the pioneer independent telephone operators in the state of Indiana.

However, such is the case. The spring of 1896 marked the beginning of my telephone career with the Home Telephone & Telegraph Company of Fort Wayne, then in process of construction.

We had then but few telephones working in town and but one iron line to Van Wert, Ohio. Fort Wayne was only a toll station, while the Bell had a well equipped exchange and, of course, such toll connections as it owned at the time.

You can imagine what it meant to induce people to come to central to answer a long-distance call when they probably had a Bell telephone in their own office or residence, but somehow we managed, and after a year or so, when the Home Company had its exchange in working order and the fight against the Bell was waged with a vengeance, the subscribers and citizens of Fort Wayne rallied to the support of the National Telephone Company, which at that time owned the toll lines, and business began to pick up. We added one toll line after another until we now cover practically all the territory in six counties in the northeast corner of the state, having a total of fifty toll line connections on our board.

Recalling the methods of handling toll calls and the equipment with which to do the work in the early days of the game, as compared with today, the improvement is simply wonderful. No one can appreciate this more than one who has experienced it.

This very remarkable improvement has been especially noticeable within the last few years, due in a large measure to the introduction of better equipment, operators' rules, and a more concerted and co-operative manner of operating, and also to the spirit of good fellowship and good business sense shown by the operators in the performance of their work.

The above Photograph portrays Miss Agnes Smith, the Toll Chief of the Home Telephone & Telegraph Company, Fort Wayne, Indiana. She is perhaps the best known toll operator in the state. There is scarcely an operator in the central and northern part of Indiana or western Ohio who does not know "Agnes." Having gained her experience in the early days of telephone strife, when to be a toll operator meant constant warfare, she has often been misquoted and misunderstood and even maligned by her modern sisters in the business, but it goes without saying that as a conscientious and thoroughly competent toll chief Miss Smith ranks with the very best. Her ability to get the business is highly developed and she has trained a corps of able and efficient assistants who all swear by "Agnes."

Ethel Payne, Fort Wayne (Ind.) Chief Operator.

Educating the Operators

By Ethel Payne, Chief Operator, Fort Wayne, Ind.

IT may be that I have not been in the telephone field as long as some of the chief operators, yet I feel I have had as many, possibly more, privileges and advantages than some. It was in May, 1905, that I first put the head band on and began learning the local work at Owosso, Mich.

Like all of the other offices at that time there was no school to teach operators, so I was placed at a board with a double head band, by an operator who told me how to plug in to answer, how to ring, which were transfers to toll desk, and other information that every operator must know.

After a week of this learning I was given certain hours to work on the relief trick; soon there was a night operator needed and I had that place for nearly a year, when I was given toll work, working both regular and relief hours; and then is when my real interest in telephone work began to develop.

In November, 1907, I was made chief operator, and at that time the managers of Michigan were holding conventions about twice a year in different parts of the state. It was decided to let the operators and chief operators attend and we were given a part in them, such as having charge of a question box, writing papers on different subjects, and a chance to ask questions or to express our thoughts on different questions brought up about our work or the office we represented. We were made to feel we were just as important a part of the work as any other department, and I can frankly say we all took a deeper interest and made more of a study of it.

We very soon became personally acquainted and knew when we worked with these offices just who the girls were and what we could expect from them. Sometimes we were sent to nearby towns for a social time and to get better acquainted with those we worked directly with each day over the wires.

Then the schools of instructions took the place of conventions, but between these we would have our own conferences at the office once a week. In them we would practice with calls, study our work geographically and with

our circuit maps; sometimes having a spelling contest, making sure we spelled the names of towns correctly; talk over our observation reports after they had been corrected, also tickets that did not look right to us; and many times we have written to the Traffic Association for help. This method became so interesting that we soon had the local operators learning toll work and all looking forward each week to our meeting as each day brought forth something for study.

For any chief operator it is not only a study of the telephone work alone, but the people she daily deals with. She should know her operators, their dispositions and surroundings, how first to make the most of them in their work and to establish a feeling of responsibility and that there is something to work for, more than merely looking forward to a pay day.

I have had operators say to me, "You pick on me more than you do the other girls." It wasn't because of the picking feeling, but because I felt interested in them and felt they were interested and tried to do their work right and I wanted to help them.

One day a telephone call came asking me to come to the traffic office to work. I was glad to go, for there one learns what is done after toll work is finished in the local and general offices. This I believe every chief operator should understand so that she can show or teach the toll operators the importance of accuracy in routings, overtime, and all details, for it is the mistakes of this kind that make the check errors that the companies have to acknowledge and settle. Here, too, we learn how the rates are measured, just how each town gets her charge for the many messages between her and all other towns she is in communication with.

During the time spent in this office many social events took place which will ever keep the work, the people and the place as pleasant memories before me.

About a year ago I went into the operating work. Going into a state among people and methods of handling their work all strange to me, many times I have felt lonely and discouraged and wondered if the work could be brought up to what was expected by the association.

It has only been with persistent effort that we are where we are today, but the most difficult of all, even yet, is to establish the feeling of co-operation with other offices, to make them feel we are trying to help them the same as we want help.

The slogan seems to be, "We can't do that—we never have;" consequently at times the work piles up on the operators, while if we all pull together and have more team work among companies and offices we would be working as one big family with a pleasure in our work and a much better satisfied public. This can be done; it has been done. Then let our motto be, "We'll try," instead of "We can't."

Features of Toll Operating

By Lauretta Pesch, Chief Operator, Plymouth, Ind.

DURING my seven years' experience in telephone work, I was employed three years by the Garrett City Telephone Company, at Garrett, Indiana, resigning to accept a position with the Winona Telephone Company at Plymouth, Indiana (my home town), as chief operator, and ever since I first started in this work I have found it very interesting, especially toll operating. We have been following the latest methods of handling our toll business, as the greater number of our toll operators have attended the schools of instruction, given in different cities.

Our operators realize the great investment our company has made in toll lines and the heavy amount of business going on constantly and the value of "Circuit Time," and therefore their aim is to get our messages completed in the shortest time possible. Our toll operators are making every effort to reduce the number of lost calls and I know we have made a gain in this direction as the number of lost calls has been greatly reduced.

Overtime is another item that we give careful attention to; our tickets are timed accurately and patrons are notified immediately after conversation of the number of minutes overtime. We have very little complaint on our overtime, as we find our patrons are willing to pay the charge when their talk is satisfactory.

Personally I think telephone schools have benefitted our operators very much, especially the smaller exchanges where instruction has been limited. Then, too, in a social way operators become acquainted and will assist each other in their work and have more patience and seem to co-operate more than if they were not acquainted.

Lauretta Pesch, Plymouth (Indiana) Chief Operator.

Michigan

F. V. Newman is secretary and treasurer of the Michigan Traffic Association. Mr. Newman was with the Detroit exchange of the Michigan State Telephone Company for 17 years, rising from office boy to assistant manager In 1901 he was transferred to Jackson, Mich., and later returned to Detroit as office manager. In 1905 he became assistant general manager and auditor of the Citizens' Telephone Company, of Grand Rapids. For a year and a half he was manager of the Dallas Automatic Telephone Company, of Dallas, Texas, but returned to Grand Rapids and the organization which has done so much for independent telephony in Michigan.

How to Eliminate Check Errors

By Margaret Fitzgerald, Chief Operator, Lansing, Mich.

WITHOUT a doubt the amount lost to telephone companies by so-called "toll errors" is, each year, very large. But if we stop to consider further we might easily observe another great loss, that of efficiency and possible advancement for the operator by the neglect of every little detail regarding each long distance call. Let us stop to consider a few of these essential parts.

First: What is the significance of that little piece of paper we call the "ticket"? It means this: the only complete record that represents the entire transaction between the receiver and sender of the message; hence, as a justice to both company and subscriber, we should exercise the greatest care in making out our "ticket."

Sometimes the "toll error" is a result of the record-

ing operator failing to put full information upon the ticket. As a result, an instance of this nature often occurs: Party is put up for the subscriber and he shortly calls back and says, "I told you I want to talk to the buyer or cashier at that office." Then the operator calls back the receiving office and says: "We did not talk. You put up the wrong party." The receiving operator says, "You got what you asked for. I have my ticket checked." What is the trouble? The operator put only the number of the telephone and not the party wanted upon the ticket.

Miss Margaret Fitzgerald is chief operator in the Lansing exchange of the Citizens Telephone Company. She was born and has always lived in Lansing. She was first a local operator for the Citizens company. She was soon promoted to supervisor, assistant chief operator and then to chief operator, which position she has competently filled for over four years. The service at Lansing has been improved considerably through the efforts of Miss Fitzgerald. One of her specialties is co-operation among operators. She is a strong believer in paying particular attention to the instruction of the new operator. This perhaps accounts for the success of her efforts. Her splendid paper on "How to Eliminate Check Errors" won first prize in the company's contest.

F. V. Newman is secretary and treasurer of the Michigan Independent Telephone and Traffic Association, succeeding W. S. Vivian when he resigned to accept the secretaryship of the Independent Telephone Association of America. Mr. Newman was with the Detroit exchange of the Michigan State Telephone Company for 17 years, rising from office boy to assistant manager. In 1901 he was transferred to Jackson, Mich., and later returned to Detroit as office manager. In 1905 he became assistant general manager and auditor of the Citizens Telephone Company of Grand Rapids. For a year and a half he was manager of the Dallas Automatic Telephone Company of Dallas, Texas, but returned to Grand Rapids and the organization which has done so much for independent telephony in Michigan.

Another thing which sometimes happens is that the receiving operator gives a "Wh" report and times her ticket from this period, while the originating operator's telephone may be busy, or her subscriber may either be in some other part of the building or perhaps may have stepped out for a minute. This error could easily be avoided in time by the operators not checking time until they were sure that both parties are on the line ready to talk, and then watch their calls closely, with the aid of some good supervision on their board; always taking care to go in on their connections, since if they do not, and allow several minutes to elapse before they take down the connections, they are unable to tell how long the party has talked and hence have to make a guess—by checking three minutes, perhaps.

Much care should also be exercised in putting the correct rates upon the ticket. (The rates are at times changed and adjusted and so, even though they have been committed, they should rarely depend upon memory for this important information—use the rate book.)

We should also plainly indicate where the ticket is "sent collect" or "received collect." Then, too, we should not overlook indicating the proper routing upon our ticket. And if, for any reason, the route on a call is changed, we should be sure to correct the route accordingly so that the right company shall receive the credit for the use of its lines.

A large percentage of the toll error trouble would also gradually disappear if we would go over our tickets when we were not busy (and the "call" was fresh in our memory), to see that the information recorded was correct, taking care to observe that if it is a "received collect ticket," we have it so marked; also that any other necessary or possible information is all mentioned on this important ticket.

Also much of the trouble of "toll error" may be eliminated by the use of some uniform time device for stamping and checking time, and having this clock so placed that it can easily be observed and used by the operators. Offices where such a device is used find it of great assistance to them, often aiding them in obtaining a most high percentage in overtime.

Next, let us view this subject from the viewpoint of the keeper of the check ledger. Much depends here upon the proper posting of the tickets. No matter how proficient a clerk may be, we are all subject to mistakes. A remedy that might be suggested for this is to check back the posting each day and devote a few minutes, if possible, to going over the books to see that they are correct.

Very few operators—and even sometimes the chief operators—are familiar with the large number of these "toll errors" and the great expense involved in this work; hence, in order to acquaint us all with the different steps, it is very beneficial to have frequent meetings, taking up the actual stages through which the "toll error" must pass, thereby enabling us to work in unison.

By careful observance of these mentioned suggestions and the courtesy, together with the co-operation of all operators, we would watch the trouble of the "toll errors" gradually diminish.

An Objection to Overtime

By C. L. Patee, Owosso, Mich.

I THINK the title of this litle article will insure the reading of it, at least by those who, like myself, are an advocate of the oft misquoted word "overtime." It seems to be the thing to compare the selling of long distance service to the selling of sugar, and right here is an error; for everyone is aware of the sweeting qualities of sugar, but of long distance, "nuff sed." When you purchase sugar you do so by the pound and it is generally put up in 5, 10 or 25 pound packages; and so it is with long distance, only it is sold by the minute and the smallest package sold is three minutes, and each additional minute is called "overtime." If one orders twenty-five pounds of sugar and immediately orders another sack this is not called overweight by ourselves or by the grocer, but simply fifty pounds of sugar. In like manner I contend that one, two, or three minutes more than the

standard package of three minutes should not be called overtime but simply time.

I sometimes think that if we sold our long distance service by the minute or the fraction thereof with a sliding scale of so much per minute or initial charge, we would come nearer to satisfying our subscribers. When some of the companies get away from the (to them) bugbear of overtime and realize the fact that they are selling something which has a time value the same as sugar has a pound value, they will then install some kind of a weighing apparatus, which with the telephone companies means some reliable timing device.

I anticipate that there are quite a number of companies who do not check the full time simply because they are afraid to do so; in other words, if they don't give their subscribers a bonus for using their long distance lines they are afraid of losing them as toll users. But this idea need not prevail, as the reverse is true. Let me give you a little personal observations: Twice within the last eighteen months two towns which I have represented at different times have stood at the top of the list of monthly overtime comparisons in this state and all during the interim we were close to the top. Not only did we retain all our toll users but we secured others and our toll steadily increased.

A square deal is all anyone has a right to ask and when we, as telephone companies, give down weight we are surely giving a square deal.

Moral: Check the entire time.

Levying the War Tax on Telephone Calls

As for the war tax on telephone messages, D. C. Cox, division general manager of the New York Telephone Company, says the preparation for the collection of the one-cent tax on all messages of 15 cents or over has been a big job for the telephone company. A special piece of mechanism had to be devised and placed in all coin box telephones. This meant changing every coin box telephone in the system, a tremendous job in itself. The tax of one cent is to be inserted, as directed by the operator, in the quarter slot in the coin box by the person who sends the message. By means of a mechanical device, the tax payment will fall into a separate compartment.

Special preparations for billing regular subscribers correctly for the tax imposed on their messages of 15 cents and over also had to be made. New collection routines had to be prepared and new systems of accounts worked out. The telephone company has advised all telephone users of the new law and the methods put into effect for collecting the tax. Notices giving full directions have been placed on all public telephones and all subscribers have been advised by means of a circular enclosed with their monthly bills. This circular explains the method of making the change for the tax and gives a digest of the law relating to it.

The law applies not only to all messages on which the rate is 15 cents or more per message, but also to all messages on which the total charge, including overtime, amounts to 15 cents or more. Thus, while a single call at the rate of 5 cents bears no tax, should the conversation be prolonged over a period which would make the aggregate charge 15 cents or more, the tax of one cent is imposed.

All telephone bills rendered during the life of this law will include a toll service statement that will show these messages on which the tax is to be levied, together with the amount of such tax.

The law directs that this tax shall be collected from the person paying for such message or conversation and places the responsibility for collection upon the telephone company.

Telephone Calls Barometer to Business Conditions

Traffic of the Chicago Telephone Company—the "yardstick" of general business conditions in the community—has since November 1 shown a decided increase and the number of daily calls now average practically the same as the corresponding period last year.

What is true of the Chicago situation applies also to the traffic of the American Telephone and Telegraph Company, whose lines reach from coast to coast and from the Canadian border to the gulf. With the beginning of the month an important and decided revival began, and today all classes of traffic, including both toll and exchange services, are 100 per cent of what it was a year ago at this time.

In October gross receipts of the Bell system for the first time in its entire history were showing a decline. Toll and long distance earnings were then 92 per cent of normal, and exchange business, taking the country as a unit, was about 95 per cent of normal. Gross earnings are not yet showing an appreciable gain, but if the present rate of improvement holds it will be a matter of a few weeks only before a comparative increase of measurable proportions is recorded

The Northwest—Kansas, Nebraska, Iowa and Missouri—are making increases in receipts practically as good as the 1913 gain over the previous year. Even in New England telephone traffic is slightly ahead of last year. In New York state, New York City and Chicago, where telephone traffic fell considerably below normal, the figures now show a decline of but a fraction below the business of last year. Practically the only delinquent at present is the South.

Traffic of the telephone company is measured by the number of calls. An electric clocking device records each call. The test is applied at irregular intervals, sometimes for a full day and at other times for an hour or several hours. These tests are usually applied so as to correspond with measurements taken on corresponding days in the year previous. They faithfully record any fluctuations in commercial life, as the telephone plays an important part in the business of today. If normal orders or inquiries are coming in the clockers will record it.

Tests made since the first of the month indicate that business is not far from where it was at this time last year. Business looks healthy and normal trade is being resumed at a rapid rate.

The tests are an excellent yardstick of the amount of business being done in the community. The average day includes about 2,000,000 calls. It will normally fluctuate around that figure, and if it is abnormally up or down, you can readily judge the reason. The traffic of the telephone company follows the business waves almost to a mathematical exactness.

At present it would appear that we are facing the most hopeful situation we have seen in two months. There can be no doubt but that business has been deferred, things that should have been done were put off. The telephone barometer shows that this deferred business is now being taken care of.

European Telephone Development

Translations from the Foreign Press and Communications from European Engineers

BY FRED W. SCHOLZ

SINCE the operation of semi-automatic telephone service in Posen with about 4,000 subscribers, and the success of that system, the German Imperial Telephone and Telegraph Department, which supervises nearly all of the telephone and telegraph work, has endeavored to extend this type of service and to test out the semi-automatic service in larger centers. The new trial service was also to give some idea as to the efficiency of connection and communication between the semi-automatic exchanges and between these and the older manual exchanges. It is just this far-reaching decentralization of the telephone system without the use of special connecting operators which gives the semi-automatic system a decided superiority over the manual system. For subdivision by means of semi-automatic exchanges, we have two ways of procedure open, using either sub-exchanges or auxiliary exchanges, or both. Sub-exchanges are fairly large exchanges, ranging in capacity up to 10,000 connections, and may be used with advantage where a larger section of telephone lines can be concentrated within a certain distance from the main exchange, and where these lines form a sort of unit of their own, either due to special business conditions, or because all the subscribers reside within a certain definite district. Such sub-exchanges usually contain all types of selectors; with a 100,000 system, for example, first, second and third groups of selectors and the line connectors. For traffic with the main exchange, and, if several other sub-exchanges are used with these, trunk lines run from the first selectors directly to these other exchanges, whereby communication between subscribers within the same sub-exchange district is carried on without troubling the trunk lines.

Auxiliary exchanges are smaller units, with a maximum capacity of 5,000 lines. These offer economic advantages where more or less distant suburban towns or communities are to be connected, whose traffic as a rule would go to the main exchange, or where conditions are such that the auxiliary exchange can relieve the main exchange trunk lines and cables of considerable traffic. These auxiliary exchanges are not equipped with all types of selectors, but have only the third group selectors, the first and second selectors being placed at the nearest main or sub-exchange. The auxiliaries have in addition the line connectors, of course. If the sub and auxiliary exchanges are operated according to the semi-automatic system, the sub-exchanges are equipped like the main exchanges for semi-automatic systems, as far as answering boards are concerned. The answering switchboards of the auxiliary exchanges, however, are united with those of the main or the sub-exchange switchboards nearest to the auxiliary exchange. Uniting all of the answering boards in one exchange building would, of course, be possible technically, but perhaps not advisable from the economic standpoint and the viewpoint of efficient handling. The long distance equipment will also differ in the two types of exchanges. In the sub-exchanges all long distance calls will be handled on special switchboards, and as telephone translators are used for all lines ending in this switchboard, and the microphones are fed from this point, the lengths of line necessary for feeding of the subscribers' microphones will be considerably shorter. In addition, it is possible to pupinize the local lines better with resulting greater efficiency. In the auxiliary exchanges where we have no special operators, connection between exchange and long distance switchboard is accomplished by special long distance line selectors, which are either controlled by the long distance operator at the long distance switchboard, or from special answering switchboards near the local call stations. Both types were tried out in the improved systems used in the Dresden and Leipzig exchanges. In Dresden the main exchange with 16,000 lines was reconstructed and a sub-exchange Striesen was built, having 2,000 lines at present, but with capacity for a total of 10,000 lines. In Striesen answering switchboards handle local traffic and special long distance switchboards handle long distance traffic. We must always keep in mind, however, that from the German point of view long distance traffic means traffic outside of the immediate local limits and suburban traffic only some fifty miles distance would be classified within the long distance traffic line. In Leipzig the telephone department was confronted by the task to relieve the overloaded cable lines without, however, rebuilding the main exchanges for lack of space, until final arrangements could be made for an entirely new system on more modern lines. The problem was solved by building a number of auxiliary exchanges with 100,-650 and 1,200 connections, respectively. These auxiliary exchanges which are built in the basements of larger residential and office buildings have no operators except the occasional trouble man. The "A" operators are all at the main exchange, where we also find the first and second group selectors for traffic with the auxiliary exchanges. Long distance traffic is handled from a special switchboard at the main exchange. Technically the Dresden equipment is like the 100,000 system in Posen; the Leipzig auxiliary exchanges as also the semi-automatic exchange in Liegnitz, however, differs in various respects (1,600 lines), and this latter exchange with its equipment will be described in detail. The new system here described differs slightly from the older grounded systems. The mechanical construction of the selectors is the same, but the line switch is replaced by relay devices, so that the mechanism of the selector switchboard has been simplified. For setting the selectors in pure automatic operation, they do not use both the a- and b-branches of the lines any more, but the connecting details at the exchange are effected by interrupting and closing the telephone circuit loop at the subscriber's telephone. This eliminates the use of ground connections for the instruments of the simple main boards and permits feeding of the sub-station instruments over the trunk lines as is done in the common battery manual exchanges. A further change is in the current supply to the microphones of the subscribers' instruments. In the present systems both connected telephones receive their feed current from the selector switch of the called subscriber, while in the new arrangement, a relay set is placed in the connecting line between the second pre-selector and the first group selector. This relay set acts as a current impulse sender through which current is sent to the

instrument of the calling subscriber. The result is that, in the decentralization of the telephone system, the subscribers' telephones always receive their microphone feed current from their nearest connection exchange and that this current is always of the same strength, regardless whether they call or are called. In the one case the relay set acts as current feeder for the translator, in the other case for the line connector. As both the translators (between II. selector and I. group selector) and also the line connectors are at the same sub-stations, the strength of the feed current need only be figured in proportion with the length of the connecting line between sub-station and subscriber. Another advantage lies in the fact that the current bridges at the various group selectors can be kept simpler, that the relay sets are smaller and the selector frames can hold more selector sets and much space is saved. The line connector is

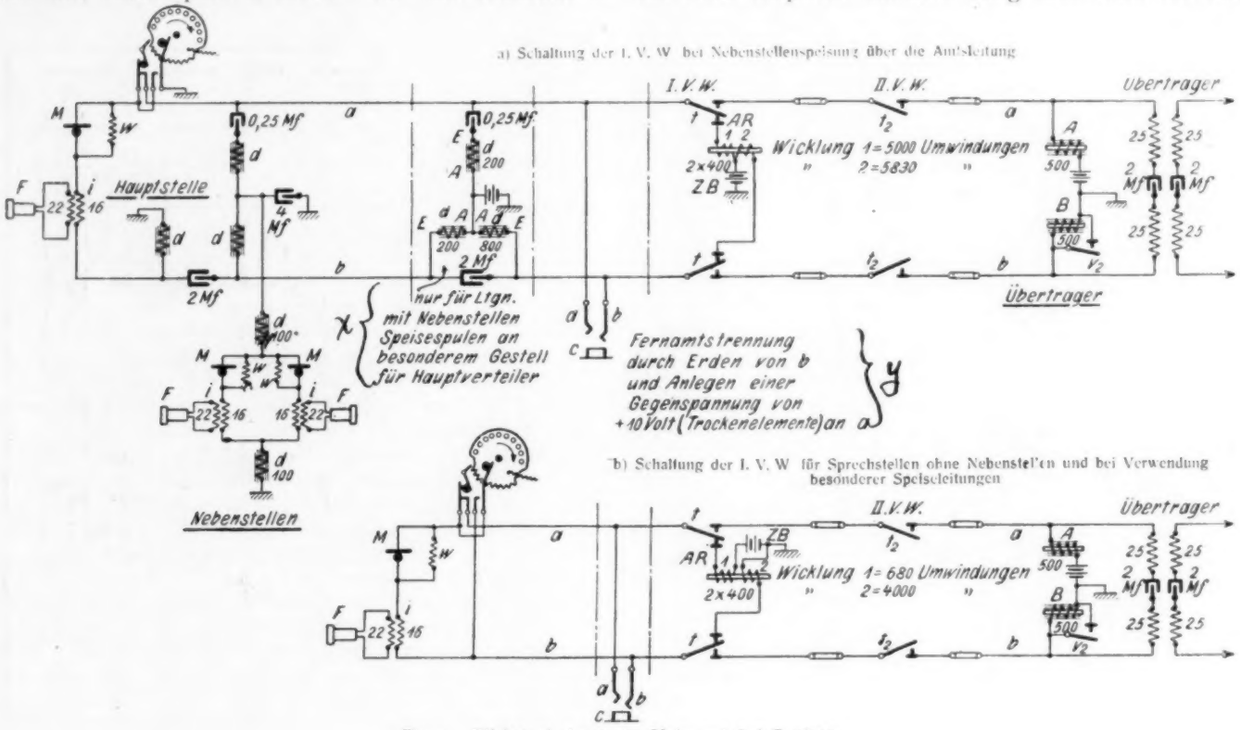

a) Schaltung der I. V. W bei Nebenstellenspeisung über die Amtsleitung
I. V. W.
II. V. W.
Übertrager
Hauptstelle
0,25 Mf
2 Mf
4 Mf
AR
ZB
2×400
Wicklung 1=5000 Umwindungen
" 2=5830 "
nur für Ltgn. mit Nebenstellen Speisespulen an besonderem Gestell für Hauptverteiler
Fernamtstrennung durch Erden von b und Anlegen einer Gegenspannung von +10 Volt (Trockenelemente) an a
Nebenstellen
b) Schaltung der I. V. W für Sprechstellen ohne Nebenstellen und bei Verwendung besonderer Speiseleitungen
Wicklung 1=680 Umwindungen
" 2=4000 "

Fig. 1. Wiring of Automatic Main and Sub-Stations.

wires, one contact group remains without connecting wires, and its a- and c-wires are arranged in such a way that the calling subscriber, if the selector finger touches this contact, receives the busy-signal. If then a subscriber calls such a line from the collective number, the selector finger tries all the contacts provided with wires to this subscriber's station. If the finger finds an open line, it stops and makes connection. If no line is open, the finger turns as far as the open contacts and gives the busy signal. In other words, such a subscriber can be called under his collective number and the selector finger will seek out an open line automatically. On the other hand,if a large business house has several of these connections, after business hours the different offices can be connected permanently to the exchange trunks without necessitating special connections from the exchange, the other telephone numbers being used from the tele-

connected, so that the disconnect is accomplished by the calling subscriber. To prevent the trouble of excluding the called subscriber from the line by the neglect of the calling subscriber to hang up his receiver, a special relay set has been introduced. This releases the line connector, when the called subscriber by moving his receiver up and down or by turning his selector disc handle, interrupts the a-branch several times.

For subscribers' stations with several wires a special connector system is used. The trunks of subscribers with several lines end not only in the multiple contacts of those connectors, to which they belong according to their telephone numbers, but they lead in parallel wiring to contact sets of special line connectors for multiple connections. Here the trunk lines without regard for the numerical order lie on contacts built up in sequence. In front of these contacts is a special contact, which can also be connected with a trunk, whose number forms a so-called collective number, which is given for this subscriber in the telephone directory. Behind the contacts of this same subscriber, connected to his trunk phone directory. Fig. 1 gives the wiring diagram for the selectors and current bridges for microphone feeding for sub-stations.

As the diagram shows, the main switchboard receives microphone current, when the sub-stations are fed by way of trunk lines, over the a-branch. Independent of this, the feed current for the substations is taken from the common battery and sent to the substations over a coil (200) of the bridge, the b-wire and the choke coil *d* at the main exchange. When changing common battery system to semi-automatic, the subscribers' telephone sets can be left unchanged at first. For automatic operation, the telephone sets must be supplied with the well-known selector disc sets. These new sets are somewhat simpler than the older, however, owing to the change in current impulse sending. They are arranged so that the connections to the telephone system are short-circuited as soon as the selector disc is moved from its initial position, and remains short-circuited until it returns to that position. In making the various turns, the a-wire is interrupted as often as the contact finger changes along the

numbers on the disc. In substation microphone feeding by way of b-wire from the main exchange, the telephone system is not short circuited, but behind the position where the contact is broken, the a-wire is grounded by means of the same springs which cause the short circuit in the ordinary telephones. In this way the audible effect of current impulses in the receivers is prevented.

The Deignitz exchange has 1,600 connections and can be extended to 3,000 lines. For these 1,600 lines, they use 1600-10 section first group selectors, 160-10 part second group selectors, 80 translator sets and first group selectors, 80 second group selectors and 160 line connectors. These arrangements have proved sufficient for even the heaviest present traffic. At present the exchange is on the semi-automatic system, having four answering switchboard places within each two sets of keys and current impulse senders. During the heaviest traffic 450 to 500 connections per hour are made. The long distance traffic is handled by eight switchboards, each with two operators. Each switchboard has about 50 long distance trunks. One switchboard is devoted to pre-payment stations and one for the nearer suburban lines. In Fig. 1 the upper diagram (*a*) gives the wiring when feeding the substations and subscribers' instruments by way of the exchange trunk lines; and (*b*) the wiring when feeding the subscribers' telephones directly without the use of substations, using special feed wires. The reading marked *x* is: Only for wires with substations and feed coils on special frame for main distributers; reading for *y*: Separated from long distance switchboard by grounding *b*—and using a counter voltage of +40 volts (dry battery) for *a; Wicklung*=winding or coil with 1500, etc., turns; *Hauptstelle*=main exchange; *Nebenstelle*=substation; *Uebertrager*=translator.—*Telegr. u. Frensprech Technik.* *(To be continued)*

TELEPHONE TRAFFIC STATISTICS.

An interesting discussion of telephone traffic questions is brought by K. Dohmen, telegraph and telephone inspector in Berlin, taken from *Telegr. u. Fernspr. Tech.*, in which he gives the differences in traffic on various days of the week and during different hours of the day.

Telephone traffic depends, of course, on a number of factors, such as locality of the exchange, business traffic of the city or town, times of the day, days of the week, and seasons of the year. Experience soon shows what times are the heaviest in traffic, what times are the lowest, and between them lies the average. These general results are usually not taken down statistically. For statistical purposes, however, certain days in each month are devoted to registering calls and to prepare diagrams showing the fluctuations. That this kind of statistical work does not give a true and accurate picture of the traffic conditions is perfectly plain, nor does it give ground for valid conclusions for any one time in the year. For the management of a fairly large exchange, it is of importance, however, to have accurate information and to know every phase of the work, not only to regulate the number of operators but also to meet traffic conditions in the best possible way. This can only be done if each connection is counted automatically. Manual recording is too complicated and costly from the standpoint of time and the error is too great. Strange to say, German exchanges are very poorly equipped in this respect and the one larger city that has such an automatic recorder is the city of Hamburg.

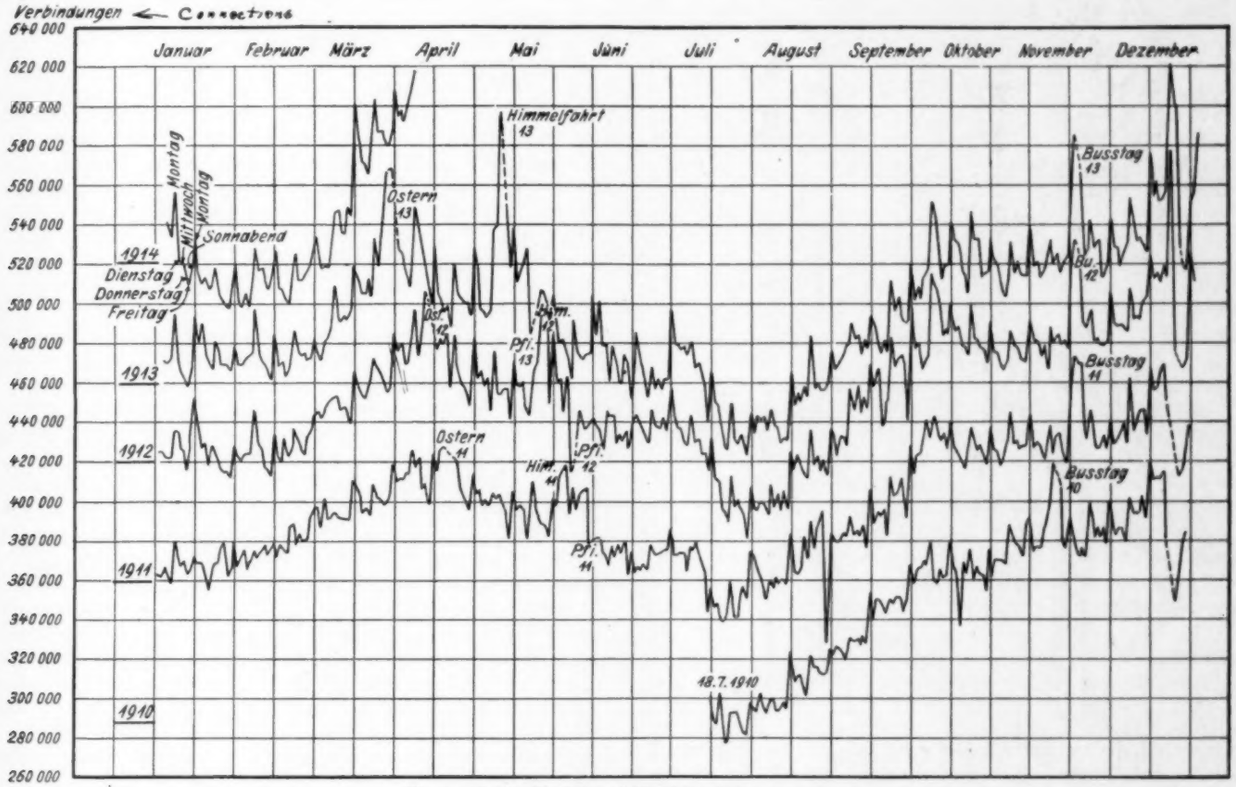


Fig. 2. Traffic Statistics of Hamburg for 1910 to 1914.

First

of all, the annual rise of the number of calls shows the business increase in Hamburg as also the ever-growing use of the telephone. It is also seen that certain times in the year show a steady rise in calls, especially the days before and after Easter, the three months before Christmas, as might be expected, and especially the last few days before Christmas. This principle of increased traffic is true of all the days immediately preceding and following a holiday. June and July show an exceptionally low traffic due to the vacation time. Immediately after the beginning of the schools, colleges and universities and the return of business men from the country, business increases steadily to reach the peak load at Christmas. Another interesting point is that the rise to the peak load does not take place in leaps and bounds, but, on the contrary, is gradually rising. On the other hand a decrease in traffic, as, for example, at vacation time, takes place suddenly. The business traffic of the various years is about the same,

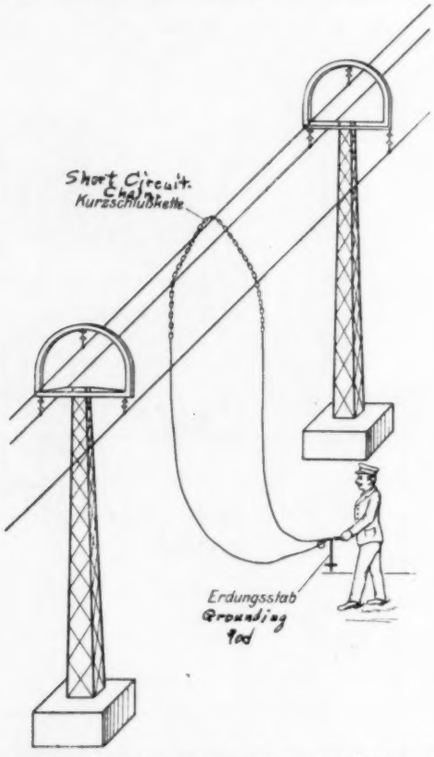


Fig. 3. Short Circuiting Safeguard for High Tension Work.

provided there are no unforeseen difficulties, as financial depressions and similar troubles. Otherwise conditions are about the same and it is possible for the exchange staff to work out the probable demands for the current year from a study of the previous year's results. Where the exchange has a larger number of operators, this is also important in arranging for vacations for the operators, and on the other hand for arranging for additional help for rush time.

The author also made a detail study of the traffic during the days of the week and found that for Hamburg the strongest traffic is on Mondays. On the following days traffic decreases to rise slightly on Saturday. Exceptions to this rule take place only when special events are taking place. The days themselves again show characteristic differences in the various hours. The morning hours from 9 to 11 a. m. show the heaviest traffic, especially the hour between 9 and 10. From 11 a. m. to 3 p. m. shows a slow decrease, and then a rise until 6 p. m., the hours from 5 to 6 p. m. giving the maximum afternoon load. The article here abstracted is not intended to give the details leading to traffic results in Hamburg. It is merely given to show that, barring special incidents or unusual conditions, the business and social traffic of a large city goes on in the same way each year. The value of such statistics for a telephone exchange has been discussed, but the one point to be emphasized is the fact that registration of calls must go on regularly and automatically through the years, if any valid conclusions are to be obtained. These statistics are also important when contemplating an expansion of the exchange facilities or planning a reconstruction to another system. It would therefore be desirable to have as many exchanges as possible register calls automatically and use these results for traffic statistics.

PROTECTION OF WORKMEN IN HIGH TENSION WORK.

On transmission lines where telephone wires are near high tension lines, it is important to safeguard the workingmen against accidents, and a short article appearing in the *Elektrotech. Zeit.* gives a simple guard for that purpose. The short circuiting device consists of a hempen rope and a very flexible special high tension cable, both connected by a 14 foot long aluminum chain. The hempen rope has double the length of the cable. To the guard belongs a grounding rod as well, with which a good ground connection can be obtained by driving the same into the ground, before the line is to be short circuited. To this grounding rod the hook attached to the end of the cable is connected. Fig. 3 shows it in use.

The grounding rod consists of a two-foot galvanized iron rod and is connected in two sections. The lower section has a cross handle and is pointed, being driven into the ground, the upper part with grounding ring is then simply screwed into the lower section. The use is as follows: After the grounding rod has been driven into the earth, the shorter end of the rope with the hook is attached to the ring of the grounding rod. Then the workman takes the longer end of rope, which is compact like any coil of rope and throws it over the high tension line to be short-circuited. The vertically suspended rope is then pulled over the wires, until the chain touches every wire, thus short-circuiting all of them and operating the short-circuiting automatic cut-out at the power station. The work on these wires or the telephone wires can then be carried on without danger. The entire apparatus weighs only 9 pounds and can be carried in any tool chest, and is easily constructed in any shop.

TECHNICAL EDUCATION OF TELEPHONE ENGINEERS.

The Bavarian Department of Telegraphy and Telephony, realizing the necessity of obtaining well-trained and efficient employes, has instituted a regular course of instruction for its employes, in which they are trained in all branches of telephone and telegraph work. This policy was adopted first, in order to obtain a sufficient number of trained men who could take the places of the older men, when these retired on their pensions at the proper age, and second, because the management realized that the advance in telephone and telegraph work within recent years along special technical and engineering lines has been so great, and calls for such a detailed knowledge of technical apparatus of the highest type, that special training is an absolute necessity for efficient operation. It was also clear that the department could get the best satisfaction from a course of instruction

under its own supervision, as it then would not leave out any essential points. In addition it was a much more sensible step to take than the system of outside training, where the men were under no guidance to speak of and learned what they could in the shops or in the course of practice.

The care of these student employes is in the hands of the construction and engineering department at Munich. Only those men are enrolled who have passed their apprenticeship as mechanics in some shop or with some smaller master workman, a system going back to the old apprenticeship days, or else, men who have graduated from one of the mechanical departments of an engineering school. Before such a man is enrolled he has to prove his fitness in this respect by performing a test piece of work under the eyes of a foreman. After passing this preliminary examination he is taken on the pay roll and sent first to the instrument shops.

The Instrument Repair Shops:—Here he works for one year under the supervision of the foreman and becomes acquainted with practically every piece of telephone and telegraph instrument used. At the end of the year he may either go on with the work and the instruction or remain at the shop for a further definite time at the pay of a journeyman. For qualifications as such, the student must pass a written, oral and manual examination and also bring proof of a moral life both in and out of service hours. In the oral test he has to answer questions regarding the use and constructions of various apparatus and the simple laws of electricity. He may do this in a written test at his own volition. In the manual test he has to construct a piece of apparatus or make some difficult repairs.

Information at the Engineering Office:—After passing his first year's work he is transferred to the engineering and designing offices, where he learns how to read wiring diagrams, to draw up plans for wiring, and to read the drawings of every type of instrument used in telephone and telegraph work. They are also taught how to find trouble quickly by the use of the wiring chart. They do very little mechanical work during this time and are then transferred to the telegraph office at Munich for a term of three months. There they perform all the work of the telegrapher, of the troubleman, first taking apart and assembling apparatus again, studying all the various kinds of telegraph work and during the last month investigating troubles and disturbances and remedying them. They are then transferred for one month to one of the substations and to the small repair plant adjoining, where they learn how to operate one of these telegraph stations on their own responsibility, to settle different problems without anything but occasional supervision. They are then transferred to the Munich telephone exchange, and first to the automatic exchanges. Here they remain two weeks, learning mainly the general working of the selectors, connectors, switches, etc. Only those men who are later to concentrate on this automatic telephone work are retained longer and are given an opportunity to study the automatic systems closely. They are also employed as troublemen, have to go out on the road to remedy troubles and handle all sorts of service interruptions in their own way. If during this time no chance of installing a real exchange is given, a test exchange is used as an example and the men are taught how to equip and install one of these exchanges. During this time they also keep a record of all line resistances, measurements of insulating resistances, trouble causes, etc. Finally, they are transferred to the Munich long distance main exchange, where they stay for three months. Within this time they work two weeks in the machine shops and storage battery shops, two weeks at the trouble department, eight days at the department for prepayment toll stations and the rest of the time at the long distance boards. They are taught how to charge the batteries, how to mix the acids, test them, take care of transformer and converter aggregates, how to operate the entire telephone exchange power plant, to repair all the jacks, plugs, relays and all of the details of an exchange and finally to take care of the prepayment toll stations out on the road. They are also taught the construction of the various recording devices, the electric clocks, the lamp signals, the day and night traffic, simultaneous telegraph and telephone operation and other details. They are then sent for two months to another city, Augsburg, where they are given the supervision of the trouble department and the study of the lines and general wiring of the telephone system. They are also required to take care of the Augsburg exchange power plant and to operate the mercury vapor rectifiers at that exchange. At the end of each period of study the director in supervision of their work has to give each man a qualifying certificate regarding the work and efficiency. A special report handed in by the supervisor gives the latter's opinion whether the man in question is better fitted for a mechanic of first or second rank or for administrative work. We have then in this case an adaptation of each man to the work for which he is fitted by natural gifts and by training. If a man proves to be inefficient he is ordered back to the original mechanical shop from where he started and is excluded from further study.

Assembling and Testing Shop.—On their return to Munich the men are trained for four months in the assembling shop of the manufacturing plant and then in the testing laboratory. They are also required to study all the theoretical material given them by their foremen and to attend weekly lectures given by experts inside and outside of the department. At this time the men learn the details of every instrument used in the work, the effect of all of them, and the methods of testing and measuring instruments of practically all telegraph and telephone instruments.

Telegraph Works.—For one month the students are now sent to the telegraph school where they learn telegraphy, not only taking messages by ear but also by sight from the telewriters. They receive general instructions regarding the rules of the telegraph department and are taught how to take care of their instruments and to make slight repairs. The laws of electricity and magnetism as far as they apply here are briefly reviewed.

Administrative Work.—They finish their work with the administrative department, where they practically take the part of a wire chief and chief of an exchange. They are required to keep the workmen's time books, make out the wage charts, monthly department reports, reports of sickness, accidents, and those cases covered by the workmen's insurance and the sick benefit insurance as also pension cases, if possible. They are employed in the stock room for the stock lists, order slips, repair slips, production costs, sending out of men on repair jobs and taking care of the office end of that work and finally to take charge for a limited time of an entire exchange. After one month the apprentice is returned to the original shop from where he started with a report of this work and a certain grade.

Electrical Engineering Course.—In the fourth year

of their studies, or in certain cases earlier, the apprentices are registered at the evening industrial school at Munich, run by the government, where they take up electrical engineering. The course is given eight hours a week, with a total of about 200 lecture hours. Taking this course is not compulsory and is left to the individual will of each man. The tuition is paid by the department. The course includes: static electricity; electric current both a.c. and d. c.; heat and light effect of the electric current; chemical effect of the electric current; magnetism and magnetic effect of the current; electrical measurements; dynamo and generators; distribution and transmission of current; electric sound waves for wireless telephone and telegraph work and telephone work; machine and engineering drawing and designing. At the end of the course an examination must be passed, the grade being added to the apprentice's record.

In addition the apprentices may take a special course devoted to the study of measuring instruments in which they are also acquainted with the most modern and most recent technical developments in instruments. This course takes 20 lecture hours and is given on Sundays and holidays from 8 to 12 a. m. so that all the employes who are fitted for the course may attend it, irrespective of their working time. At the end of the complete course, the apprentices are appointed on the basis of their grades and reports to foremen or to higher positions in the administrative departments. If they wish to qualify for the higher positions in the telephone and telegraph service, they have to show qualifications of the following subjects: (a) Knowledge of the regular departmental rules and instructions. (b) Elementary school training, arithmetic, writing a composition on a theme in connection with the work. (c) Construction both practical and theoretical and all the details of all the instruments and equipment used in telephone or telegraph work or both. (d) Acquaintance with the simpler theories of electricity and magnetism as applying to this work. (e) Knowledge of the duties of inspectors, foremen and exchange managers. (f) Knowledge of the interior organization of the telegraph and telephone departments.

The course has, as far as it has gone, been very successful and has given and is giving material for the department, which is well trained, efficient, and will prove of immense benefit in bringing the efficiency up to the highest point.

Offers Solution of Chicago Automatic Situation

A surprise was sprung on the Chicago city council committee on gas, oil and electric light, which is considering the proposed sale of the automatic telephone system to the Chicago Telephone Company by the City Telephone Bureau.

Three young men, all city hall employes, presented a proposal for a solution of all the legal, financial and engineering problems involved in the admitted failure of the automatic telephone, its request for permission to sell out its equipment and rights, and the counter demand of the Penny Phone League that the city confiscate the plant under the forfeiture provision of the company's franchise.

This latest opinion ignored the law views of Corporation Counsel Sexton, who held this forfeiture clause worthless and advanced a theory that the city might confiscate not only the telephone plant but the tunnels, which are the chief property of the Illinois Tunnel and Telegraph Company, the franchise holder.

The three men who made the suggestions proposed a plan of procedure they said would permit a retirement of the indebtedness of the automatic company, although the Armour and Harriman interests have been unable to devise a means to this end. And they said their methods would result in lowering instead of increasing telephone rates.

They told how the automatic equipment, instead of being discarded or continued in use as a small system by itself, could be made an integral part of the Bell or manual system. In fact, this was the basis of their plan of procedure. Also it was the only point presented by them to which any serious reply was made.

In a word, they recommended that interconnection and exchange of calls be forced on the Chicago Telephone Company after the city had seized the automatic plant and begun its operation or leased it to some company. One of the attorneys present interrupted the program by declaring that compulsory interconnection is prohibited by the state public utilities act.

The three young men argued all the questions of law presented by the city law department and the attorneys for the company against the theory of confiscation. And their whole procedure, they indicated, was an interest in protecting the council committee and guiding it in the right path to avoid criticism.

The three young men are all members of the recently organized public service department in the city hall. They are Commissioner Montague Ferry and his aids, G. W. Cummings, telephone supervisor, and Arthur Kneisel, assistant telephone supervisor.

A formal communication from Mr. Ferry opened with a statement that, in spite of the company's admission that it has not 20,000 bona fide subscribers, the counting of its subscribers by his department should be continued.

He then took up the arguments advanced in favor of the proposed merger by Attorney Ralph M. Shaw. He charged they were "sophistry," intended to distract attention from the real issues.

"Are you certain," read one of the closing paragraphs, "that the forfeiture clause does not provide that all this property will be forfeited to the city in case of attempted sale? Are you not considering the possible forfeiture of a property of much greater value than $6,000,000?"

Mr. Cummings spoke upon the law of evolution and its application to public spirit, which would end, he said, either in adequate regulation of public utilities or in public ownership.

Mr. Kneisel presented an outline of three plans of procedure based on the theory of confiscation, one continuing on a theory of the city's leasing the property to a new company which would assume the bonded indebtedness of the present company, this indebtedness to be amortized by a fund provided out of revenue received from the Chicago Telephone Company on interconnecting business originated by the latter company.

Cross Bill in Central Union Receivership

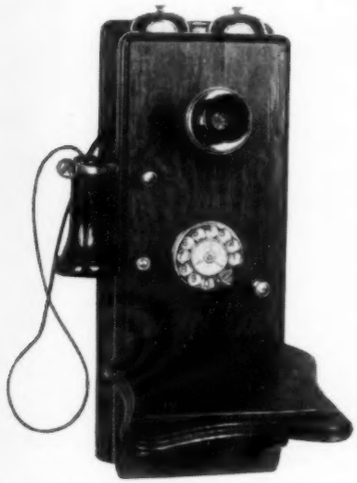
An order permitting the American Telephone and Telegraph Company to file a cross bill to the suit brought by William A. Read against it and the Central Union Telephone Company, seeking a receiver for the latter corporation and an accounting between the two companies, was entered recently by Judge Dever in the superior court at Chicago.

Automatic Telephony in 1914

Factors Which Resulted in Making the Last Twelve Months an Automatic Year

FOURTEEN automatic exchanges, totaling 42,000 lines, were put in service during past 12 months, while many advances have been made in the mechanical operation of the automatic switches.

Automatic telephony is by no means a new thing. The idea of establishing telephone connections by means of machines, rather than by human hands, is almost as old as the discovery of the electrical transmission of speech itself, and the embodiment of this in a practical and successful mechanism was first accomplished some 26 years ago.



The Rural Line Automatic Telephone Instrument.

A. B. Strowger, then of Kansas City, Mo., may properly be called the father of automatic telephony for it was his invention which is the basis upon which has been built the system which today is operating in more than 100 exchanges located in every quarter of the civilized world, and is serving a total of three-quarters of a million of subscribers. The work started by Mr. Strowger has been carried on by Automatic Electric Company of Chicago, and that firm is now universally recognized as holding a foremost rank in the automatic telephone field.

But of all the years that have passed since this company began operations, none has witnessed a greater measure of success than the one just closed. Since January, 1914, fourteen automatic exchanges of the Strowger type have been placed in operation. They have a total initial installed capacity of over 42,000 lines, and are located in the United States, Canada, Australia, India and South America. The manual plants at Buffalo, N. Y.; Regina and Medicine Hat, Canada; Cordoba, Argentina; and Perth, Australia, have been displaced by automatic equipment, while a number of offices in the Sydney and Melbourne metropolitan areas are now operating automatically, and eight more exchanges in the same region are now in course of construction.

During 1914 orders aggregating over 63,000 lines of central office automatic equipment have been placed with Automatic Electric Company or with companies manufacturing and selling this apparatus under its patent licenses. These contracts cover installations for 21 exchanges. The countries included in this list are the United States, Canada, Australia, England and Scotland.

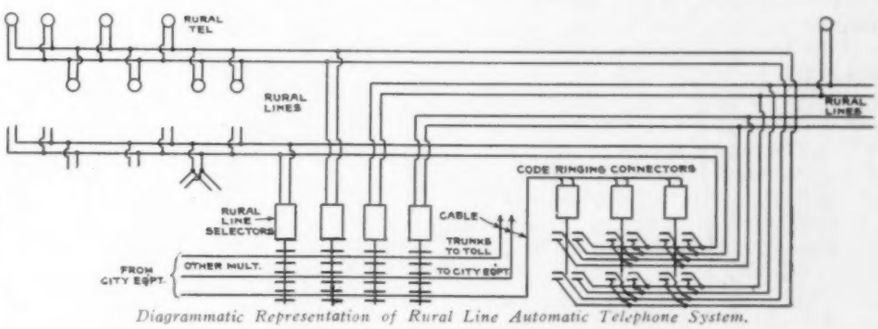
In addition to these contracts for new installations, orders for some 20,000 lines of central office equipment have been placed, to be used as extensions to existing automatic systems. Practically all the exchanges now operating have experienced a growth during this period which has necessitated the addition of some facilities. In some cases these were small, being only a hundred or so lines. Due to the design of automatic equipment, it is entirely practical to build up a plant gradually in this fashion, and this permits substantial economy by rendering it unnecessary to tie up considerable capital in investments not immediately productive.

In other cases the companies have added very materially to their plants, installing new offices in hitherto undeveloped areas or rearranging cable plans so as to secure greater economy in this respect. This represents another great saving possible with automatic equipment, since the cost is but little different to operate a given number of automatic lines in a single office or in many, thus making available almost the entire economy in outside construction due to multi-office designing.

Among the exchanges that thus have been enlarged during 1914 may be mentioned Dallas, Texas, 5,000 lines; Los Angeles, Cal., 3,000; Columbus, Ohio, 2,900; Jacksonville, Fla., 2,500; Portland, Ore., 1,300, and Geelong, Australia, 500.

But the significance of the year 1914 in automatic telephony does not rest solely upon this remarkable spread of the automatic system, for during this time a number of advances have been made in the equipment itself. The essential principles of the apparatus and its general design remain the same, the progress consisting mainly in extending automatic operation in directions until now not occupied, or but partially covered.

Among these may be mentioned the rural line automatic telephone system, the creating and perfecting of which is regarded as one of the most important and significant events in recent telphone history. Rural line automatic telephony is a logical and inevitable development of the automatic system as devised for urban service. It is simply the extension of the principles of mechanical operation into an hitherto unoccupied field.



Diagrammatic Representation of Rural Line Automatic Telephone System.

In essentials, the rural line automatic telephone dif-

fers in no wise from the urban automatic equipment, and embodies all the well-known features of that system. The equipment involved in this system and its operation may be described briefly as follows:

It operates as an eight-party, automatic ringing, rural party line. The selection of the desired line, the ringing, the busy signal and the release are all positive and mechanical and are controlled by the subscriber through the manipulation of his switch-hook and calling dial, which is precisely the same in appearance and construction as that used on urban systems.

In order to avoid interference in calling, the action of the switch-hook of the rural automatic telephone instrument is so arranged that raising the receiver closes the talking circuit, and by listening the calling subscriber is able to tell whether his line is engaged. If he finds it free, he presses a push button which places his instrument in a condition to make a call.

Regular automatic operation, differing in no respect from city service so far as the subscriber is concerned, establishes rural to rural, rural to city, and city to rural connections.

Rural lines terminate at the exchange, either in repeater selector switches or in line switches, as conditions may require. The line switches select trunks to repeater selectors. The repeaters are employed in order that the line relay in originating calls may be operated by current from the exchange ground only, thus eliminating the effect of slight tree grounds, etc.

The operation of the rural line automatic telephone is precisely the same as the urban system. Lifting the receiver from the hook (and depressing the push button) connects the instrument to a selector switch in the central office either directly or through a line switch. All rural telephone numbers on any particular system begin with the same digit (for example, 7) and dialing this connects the line to an idle connector switch. The next two digits select the proper line, while the last digit of the dialed number actuates the ringing selector which picks out the proper current frequency and starts the ringing machine sending the current out on the selected line. Restoring the receiver to the hook releases the switches and the line is again ready to call. Dialing an engaged line automatically sends the busy signal to the calling subscriber.

Rural subscribers connect to the city telephones by dialing the regular directory number, the various levels of the rural selectors being connected to the second selectors of the city system. The proper level of the first selectors of the city system (for example, the seventh) is connected to the rural connectors, and city to rural calls are made by dialing the desired station number.

Rural subscribers obtain access to the toll operator by dialing "O" and reach "Information" by calling the numbers used in the city system. In other words, the rural line automatic system is simply an extension of all the features of the city automatic operation into the surrounding country region. The operator is entirely eliminated. The cost of giving service is reduced to a minimum, and the service rendered is made comparable to that of city subscribers.

Another very important application of automatic equipment to the telephone problem is found in the automatic traffic distributor, which was developed some time ago by Automatic Electric Company. During the past year two exchanges operating this equipment, those at Indianapolis, Ind., and Defiance, O., have been placed in operation and are rendering a service which has proved highly satisfactory to the companies and the patrons.

The automatic traffic distributor apparatus consists of Keith line switches (which equipment is an integral part of the full automatic telephone system, being there used to connect calling subscribers to idle first selector switches) and a common battery manual multiple switchboard equipped with plug ending trunks, in lieu of answering jacks and double end cords.

Each subscriber's line terminates in a Keith line switch, instead of at an operator's position, as in ordinary manual practice. These line switches are grouped in hundreds, each group being controlled by a master switch. From each 100-line unit ten trunks are led to the various switchboard positions, and any call coming in will be automatically routed over an idle trunk to a non-busy operator.

Some of the more conspicuous advantages resulting from the adoption of this type of apparatus are:

Great rapidity of service. The answering time has been cut to a fraction of a second, and it has been found that the average time used in connecting and disconnecting, that is, holding time less talking time, is seven and one-half seconds.

The service is uniformly excellent. Since no calls come to engaged operators, the girls are never overrushed. Nor do they have to serve more than one position at a time, since traffic is routed only to occupied positions.

The operators are able to work at their best efficiency all the time, since calls are brought to them as rapidly as they can handle them, but no faster.

The traffic distributor equipment permits an accurate adjustment of the number of operators to the load. As the traffic increases, more positions can be placed in service until enough are occupied to handle the load. As the number of calls decreases, these positions can be vacated, each one being rendered "busy" in turn and all calls concentrated on those positions at which operators are on duty.

The work imposed upon each operator is reduced to a minimum. This is due to the fact that on the automatic traffic distributor switchboard no listening keys are used and the number of operations involved in setting up a connection is reduced from the five usually required in ordinary manual practice to two, which are practically simultaneous, namely, plugging in on the multiple jack and depressing a ringing button. The fact that calls come to the girls in an even, steady flow without "rushes" and without slack periods, enables them to work with a much more uniform efficiency, and tests have proved that a competent operator at the traffic distributor board is able to handle continually 400 calls per hour without feeling undue fatigue.

The operation of the traffic distributor system is very simple. When a calling subscriber lifts his receiver from the hook the line switch instantly picks out an idle trunk leading to a non-busy operator, and connects the line through to the operator's head set. A signal lamp associated with the trunk glows and the operator, seizing the trunk plug, asks for "Number?" Making the usual busy test, she plugs in if she finds the desired line free, and depresses one of two buttons which sends ringing current automatically out over the line at rhythmic intervals. The ringing continues until the called subscriber answers.

As soon as the trunk is plugged into the multiple jack, the operator's head set is cut out of the circuit,

and pressing the ringing button once completes the girl's duties. If she finds the called line busy, she plugs in on a "busy" jack, which frees her of the call and sends a busy "buzz" to the calling subscriber. Positive double supervision is provided, and the connection is broken by pulling down the cord.

A third important development of automatic operation is that found in the application of the dial to long distance calling. This method has been in operation for a number of years, but it has been developed and extended to a remarkable extent during the past year and it is now the rule to find the dial calling device on the toll boards located in the territory tributary to each automatic exchange. No limit as to the length of line over which it is practical to make calls automatically has yet been discovered.

With this equipment the toll operator in the originating exchange is able to set up connections direct with any subscriber in the automatic exchanges in the same manner as though she were calling from an automatic telephone in the city itself. This not only eliminates the toll operator at the called exchange, but enables a "rapid fire" service which is practically as fast as local connections. This is very much appreciated by the patrons and tends to secure for the company increased long distance business, while the rapidity of connections enables the lines to be used much more effectively and gives them a higher efficiency.

What the future may hold for automatic telephony no one can predict. To set limits to its application and adoption would be folly, and basing a judgment upon the past, it is only fair to say that the telephone operating problems which confront us today will be solved very largely, if not entirely, by means of automatic apparatus.

Slight Advance in Bell Earnings

The American Telephone Company's earnings, starting November 1, have increased each succeeding week. The first week in November the gross receipts of the big Bell system were a fraction over 100 per cent of what they were for the same week of 1913. In September and October traffic was making comparative decreases and at one time got down to 95 per cent of normal.

For the last two weeks traffic has been 102 per cent of what it was for the corresponding week of 1913. While not a big advance, it is an encouraging one, and for a corporation whose weekly gross income is substantially over $4,000,000, it is most important in the matter of dollars and cents.

Strictly speaking, this 102 per cent of last year's business is not "normal." A proper gain in gross would be 6 to 8 per cent. A normal expectancy would, therefore, be considerably larger than is now being realized.

At the same time it is well to bear in mind that the first six or seven months of 1914, before the European war began, were not a period of satisfactory telephone growth. The expansion in this period was only a little over 5 per cent against 8 per cent in 1913. Poor business conditions were clearly slowing down the gain in the Bell system's receipts. The war, on present showings, has slightly more than cut in two the gain of the earlier months.

The present outlook is that the American Telephone Company and its operating companies will conclude the fiscal year on December 31 with an addition to gross of between $6,000,000 and $8,000,000 of new business, bringing total gross up to about $223,000,000 against $215,572,000. Back in 1912 when skies were sunnier the Bell people tucked away $20,000,000 of new business in a single twelvemonth.

Rochester-Buffalo Automatic Service

Rochester, N. Y., has put into service a new telephone equipment, one that will increase the speed and facility of long distance calls between Rochester and Buffalo.

Briefly, the innovation is the adaptation of the automatic telephone dial to long distance purposes on calls between the Rochester Home Company and the Federal Telephone and Telegraph Company, its connecting company in Buffalo, which is now equipped with automatic service throughout its Buffalo system.

The dial, affixed to the Rochester long distance board, enables the Rochester subscriber to call, giving the Buffalo Federal number wanted, and be instantaneously connected with the Buffalo party. There are no waits, no conversations with or directions to an intermediate operator and the whole long distance transaction is reduced to the time, facility and ease of a local call.

At a test recently numerous calls were made to Buffalo and communication established in much less than 20 seconds. The process which is made possible through the flexibility and adaptability of the automatic ssytem is simple and wonderfully efficient.

For the purpose the Rochester long distance board becomes, to all intents and purposes, an ordinary subscriber to the Federal Telephone Company's system. The Rochester party calls Rochester "central" and says, for example: "Give me 44327 Buffalo." The Rochester operator dials that number in the ordinary way and 44327 Buffalo answers instantaneously, precisely as if the call were local. There is no hanging up the receiver and waiting, there are no recalls—just direct service. It is not necessary for the Rochester party to give the number of the Buffalo party wanted; it is difficult to give the name as now. Giving the number, however, gives the service even greater speed, since the operator does not have to take the time to look up the number.

First Destructive Storm of the Winter

Two days, December 7 and 8, of sleet, rain, cold high winds and falling trees resulted in 25,000 miles of fallen wire and 1,200 poles down on the toll and local lines of the Southern New England Telephone Company. By prompt and effective emergency shipments of material for making temporary repairs from the Western Eelectric Company's warehouse at West Haven, Conn., it was possible to re-establish toll lines to every exchange in the state by the evening of December 10.

In the seventy-two hours that elapsed between seven p. m. December 7 and the same time December 10 there were shipped over one million feet of twisted pair copper steel distributing wire, 93,000 pounds of bare copper wire, 19,000 pounds of iron wire, over a ton of copper tie wire, and 26,000 sleeves, as well as a great quantity of other line construction material. The total bulk shipped during this period weighed over 109 tons and was moved in six special trolley freight carloads, three special freight cars and numerous express shipments. The transportation companies by co-operating with the shippers in every possible way aided greatly in the rapid restoration of telephone service.

Southern Railway's Telephone Block System

The Southern Railway is preparing to install a telephone block system to take the place of the telegraph system now in use on the Atlantic division, between Macon, Ga., and Ooltewah, Tenn., a distance of 225 miles, and part of the route of the Southern Railway's through trains between the West and Florida. The present telegraph block system consists of one telegraph wire. The telephone block will consist of two wires, and each office will be equipped with one bell on the north block and one bell on the south block, with the telephone so installed that it can be connected with either. The lines will be so arranged at the offices that when a block office is closed the line can be cut through it. The wires used for the telephone block will also be used for a telegraph circuit from Atlanta to Macon, and for another circuit from Atlanta to Ooltewah into Chattanooga. In order to take care of the heavy Florida traffic last winter, a telephone block was put in operation between Macon and Jesup, and was found so satisfactory that it has now been decided to extend the system over the line between Ooltewah and Jesup. The new system will be put in effect as soon as the change can be made.

How Fire Alarm Affects Traffic

More than 150 members are guests of the Springfield Club, of Springfield, Mo., and visited the Missouri and Kansas Telephone Company on the fourth of the series of inspection trips to Queen City industries and manufacturies, being conducted under the auspices of the "See Springfield First" committee of the Springfield Club.

Immediately after luncheon was served at the club house thirty-two automobiles conveyed the party to the telephone company's plant. The party was divided in two sections, one under the leadership of W. H. Rathbone, general manager, and the other under A. C. Daily, president. The tourists then were conducted through the plant.

A feature of the visit to the telephone exchange was a false fire alarm which was turned in for the entertainment of the club members. A call from South and Walnut streets was turned in with the consent of the fire department, and apparatus from station No. 3, together with Fire Chief W. R. Price, made a run to the source of the alarm. Within a few minutes after the apparatus had sped through the city streets no less than 2,000 inquiries as to the scene of the fire were received at the Springfield Exchange board.

Shanghai Telephone Service

Consul-General Thomas Sammons, Shanghai, China, reports that the telephone service at Shanghai is provided by a local company which now utilizes upwards of 5,000 telephones, and which is at present building an additional exchange in the residential part of the city.

The telephone instruments now used by the company were manufactured in Stockholm, Sweden, and are far from being as satisfactory as those in use in the United States.

The Shanghai Mutual Telephone Company, Ltd., which provides the telephone facilities at Shanghai, was organized in March, 1900, and, during its fourteen years of existence, has grown steadily.

The nominal capitalization of the company is $600,500 divided into 20,000 shares of the par value of $31,125 each. There have been issued 14,540 shares at par value, making a total of $452,557.50 paid in. On this sum the company paid, at the end of the last fiscal year, a dividend of 8 per cent.

The total payroll of the company was, last year, $50,889.09. Of this amount $32,641.45 were paid to foreign employes, and $18,247.64 to Chinese employes.

San Francisco Rates Increased

The railroad commission has rendered a decision authorizing the Honey Lake Valley Mutual Telephone Association, operating in Honey Lake valley, Lassen county, California, to raise its rates for telephone service as follows:

Business stations, $2.50 per month; stations connected with the Susanville exchanges of the Nevada, California and Oregon Telegraph and Telephone Company, $2 per month; other residence stations, $1.50 per month.

These rates are a compromise between the rates then in effect and the rates applied for by the telephone company, and were agreed to by almost unanimous consent of the company's patrons and by the company's counsel, with the understanding that these rates are to be given a year's trial, and if after the expiration of that period the result may appear to justify further modification, the matter may again be submitted to the commission for consideration.

Curious Exchange Accident

Sixteen girls employed in the main exchange of the Keystone Telephone Company, Second and Sansom streets, Philadelphia, Pa., recently narrowly escaped death when the heavy steel and plaster ceiling in the main exchange room collapsed, burying the operators beneath the debris. But for the fact that the ceiling dropped on the top of the seven-foot high switchboards, which circle the big room, it is probable that many of the girls would have been fatally injured.

For 35 minutes 9,000 telephones in the central section of the city were out of commission. After the firemen succeeded in dragging the heavy metal covering and the plaster from the tops of the switchboards, however, the operators pluckily resumed their work. During the whole afternoon a dense dust of plaster filled the main exchange room and it was with difficulty that the girls could operate the exchange. Covering their heads and clothes with towels and cloths, they stuck to their posts and few subscribers of the company were inconvenienced by the accident.

On March 14, 1914, there were 920 telephones in use in the commercial telephone system of Vladivostok, Russia. This number does not include those in the military or fortress system, which is independent and has several hundred telephones. The latter system is connected with all outposts, as well as the commercial system of Vladivostok, which is quite generally commended for the excellent service rendered to its subscribers.

The telephone cable between the three largest of the Faroe Islands has for some years been nearly useless, and the authorities have submitted a petition to the Danish government for the establishment of a wireless service between the islands instead. It is possible that this will lead to the establishment of a wireless service between the Faroe Islands and Iceland also.

Telephone Relays On Commercial Circuits

British Post Office Experiments Told in the London Electrician

BY C. ROBINSON AND R. M. CHAMNEY

THE problem of increasing the range of telephonic communication by means of relays has occupied the attention of inventors for many years, and several practical forms of telephone repeaters are now on the market. Difficulty has, however, been experienced in utilizing them on commercial circuits owing to the necessity of relaying the speech currents in both directions. Trials on working circuits have been made recently by the engineering department of the British Postoffice, and some account of the duplexing methods employed may be of interest. It is not proposed to deal with the telephone relay itself, which may be of the mechanical type or depend for its action upon the conductivity of certain rarefied gases.

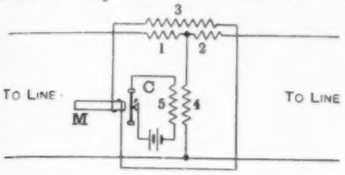


Fig. 1.—Two-Way Relay Circuit.

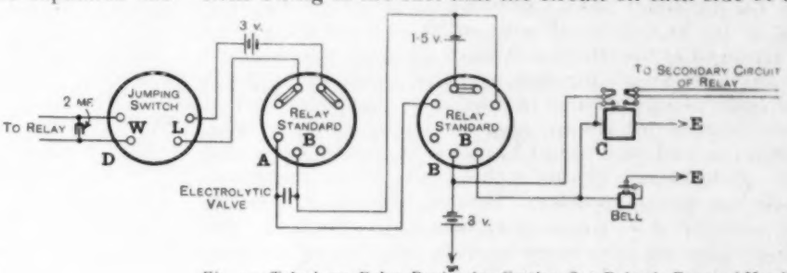


Fig. 3.—Telephone Relay Device for Cutting Out Relay in Event of Howling. W = Receiving Coils. L = Local Contact.

The most reliable methods of providing duplex working on a single circuit, which have been tested hitherto, are similar in principle to that due to Edison. A diagram of this arrangement is shown in Fig. 1 and the action is as follows:

Speech currents from either terminal telephone pass through the winding of the transformer, which is connected in the line. These induce currents in the receiving coil of the relay, which in turn acts upon the microphone, producing strengthened currents in the secondary of the induction coil.

The strengthened current divides at the center point of the transformer, and, if the impedances of the two lines are equal, it does not affect the receiving coil of the relay.

It was found in practice that this arrangement was unstable owing to interaction between the microphone and receiver of the relay. The balance of the repeater was upset by the changes of the terminal connections owing to the fact that the circuit on each side of the relay was not approximately equivalent to an infinite line. This interaction produced a loud continuous note which effectively stopped all communication.

Efforts were made to increase the stability of the system, and it was found that the arrangement shown in Fig. 4 gave considerably improved results. It will be seen that transformers have been introduced on each side of the repeater station. The windings of these transformers were in the ratio of 2 to 1, the low winding being connected to the relay side.

The loss in transmission efficiency due to the introduction of these transformers is equivalent to approximately 2½ miles of standard cable, and the gain in stability is considerable.

It was found that it was not necessary to maintain an extremely accurate balance, the more important condition being that the receiving coils should be out of phase with the disturbing impulses emanating from the microphone.

That is, current in the receiver coils due to an increase in the resistance of the microphone, and therefore

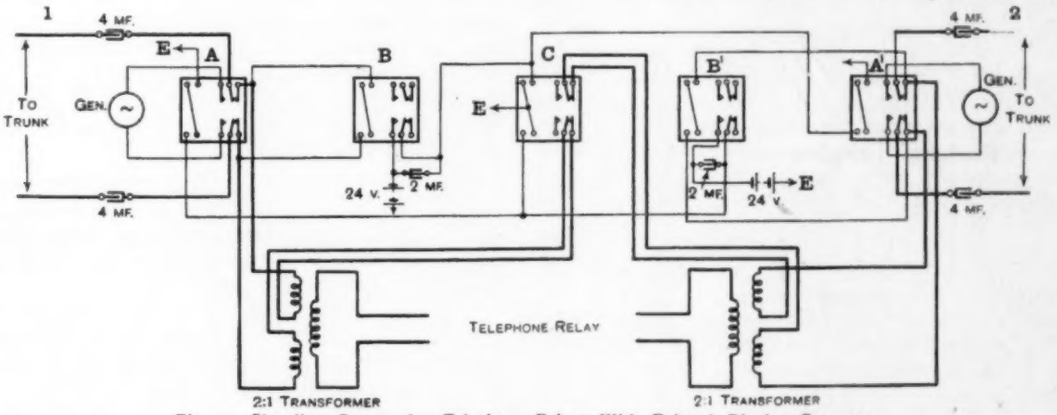


Fig. 2. Signaling System for Telephone Relays With Relayed Ringing Current.

caused by a strengthening of the flux in the receiver poles, should pass through the coils in a direction to weaken the flux.

If this condition were fulfilled, no "howling" occurred as long as the out-of-balance current was less than

the received current. It will be seen from Fig. 4 that a switch is provided for reversing the connections of the receiving coils of the relay. By means of this switch the most stable direction for the receiver coils can be found by trial. A resistance with a sliding contact is also provided for the adjustment of the currents in the two halves of the duplex circuit.

With these modifications the repeater worked satisfactorily as long as no definite fault occurred on the lines. The improvement obtained for one relay station was equivalent to from 10 to 15 miles of standard cable. If the improvement exceeded 15 miles, or if the line was faulty, the balance became unstable. In either case the relay could be retained in circuit, and some improvement maintained if its sensitivity were reduced by shunting the receiver coils with a resistance, or otherwise.

In place of the transformer, tests were made using a split condenser or inductance coils or with the receiving coils of the relay wound differentially. These arrangements gave similar results to those obtained with the transformer, the maximum improvement obtainable consistent with stability being equivalent to about 15 miles of standard cable.

In the event of the lines becoming considerably unbalanced the relay commences to "howl," and it is necessary, in order that the system may be practicable, to provide some automatic indication of the occurrence of howling and at the same time to disconnect the repeater so that conversation may go on between the terminal stations if the line is not too long.

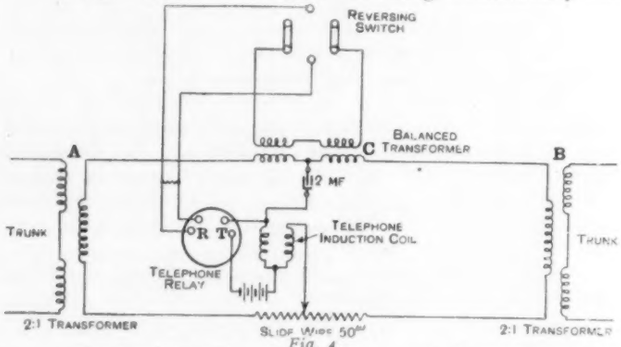


Fig. 4.

R = Receiving Coils. T = Transmitter.

As the result of measurements of the alternating current in different parts of the relay circuit, due to speech and howling, it was found that the currents due to these causes did not differ sufficiently widely to provide the means of automatically differentiating between them. The only essential difference was that the alternating currents due to howling were unbroken, while those due to speech were intermittent. The automatic cut-out shown in Fig. 3 is based upon this fact. The action is as follows:

The strengthened currents from the repeater pass through the receiving winding of a vibrating relay, *D*. The relay used for this purpose was made by S. G. Brown, and consists of a steel reed forming the armature of a powerful permanent magnet provided with pole-pieces, upon which receiving coils are wound. A light arm provided with a carbon contact piece rests on the reed and normally makes contact with it. When the alternating current passes through the receiver coils the reed vibrates and causes the contact to be broken. The receiver coils are shunted with a 2 mf. condenser in order to reduce the loss due to their insertion in the circuit. A polarized telegraph relay, *A*, is normally actuated by the current through the local contact of the vibrating relay. When the latter vibrates the tongue of the relay *A*, which has a marking bias, moves over to mark. Relay *B*, which is connected on the local circuit of relay *A*, is made extremely sluggish, so that it is not actuated unless relay *A* is held over for about three seconds. This is done by means of an electrolytic valve constructed of two iron plates immersed in a solution of caustic soda.

The valve is normally short-circuited by the local contact of relay *A*, and the current divides equally between the windings of relay *B*. When, however, relay *A* is actuated the valve gradually polarizes and the effective resistance rises. In a certain time the current in the winding connected in series with the valve falls to a sufficiently low value to enable the relay to be actuated by the current in the other winding.

The time lag depends upon the area of the plates of the valve and upon the bias of the relay. Plates of an area of about 40 sq. cm. were used in the present case.

A non-polarized relay, *C*, is connected in the local circuit of relay *B* in order to provide the necessary local contacts for cutting out the repeater, etc. This relay fulfills three functions:

1. It disconnects the secondary circuit of the telephone repeater from the line.

2. It actuates a bell or other indicator to call the attention of the attendant to the fact that the cut-out has been actuated.

3. It locks, to that the action is permanent until restored by the attendant. Speech from either end causes relay *A* to vibrate, but does not affect relay *B*. "Howling" actuates relay *A* continuously, and, after the predetermined time lag, actuates relay *B* and the repeater is cut out.

When the repeater is disconnected speech can be carried on through the repeating coils if the circuit is not too long for direct speech.

These arrangements render the relay applicable to working lines so far as speaking is concerned, but it was also necessary to provide for signalling between the terminal stations. The arrangement employed for this purpose is shown on Fig. 2. The action is as follows:

Generator rings from terminal station 1 actuate relay *B*, which in turn actuates relays *A'* and *C*. Relay *A'* disconnects relay *B'*, and the telephone repeater from line, and applies a generator to the line connected to terminal station 2. Relay *C* disconnects the telephone repeater from both lines.

The action from end 2 is similar, relay *A* being actuated in place of *A'*. Condensers of 2 mf. capacity are connected across the contacts of *B* and *B'* in order that a trembling action of these relays due to the alternating signaling currents may actuate the local relays steadily.

The instantaneous impulse received by the telephone relay at the commencement and end of ringing has not been found to affect the telephone relays seriously, but should this occur it will be necessary to signal over a superimposed earth circuit.

All the relays employed in his arrangement are non-polarized and wound to a resistance of 2,000 ohms. Relays *B* and *B'* are provided with heavy armatures so as to be actuated steadily by the generator currents.

In conclusion it should be mentioned that tests carried out hitherto have been on open lines which are necessarily subject to disturbance. On underground circuits, owing to their greater stability, a more sensitive arrangement could probably be maintained, giving a greater improvement than that obtainable in the case of open wires.

Public Utility Commission News

Reports Concerning the Activities of State Regulating Bodies in the Telephone Field

Interstate Commerce Commission

IT has been brought to the attention of the commission that blank-book makers and publishers are circularizing class C telephone companies, stating that the commission requires such telephone companies to use books and forms similar to those given in the bookkeeping system contained in the appendix to the system of accounts.

This statement is erroneous, as the commission does not require that such companies adopt the bookkeeping system included there. It is merely suggested for such companies as may desire to use it. If a company has in use books and forms which are satisfactory to it, no change need be made if such books and forms will produce the results contained in the system of accounts.

Ohio

The Ohio State Utilities Commission is at last confronted with the problem of deciding the long-contended question as to the rights of telephone companies in their relations with the public.

The question arises through the refusal of the Cincinnati and Suburban Bell Telephone Company to accord the Sixth Avenue Realty Company a line which the Realty company may attach to as many instruments as it desires.

The Realty company has fitted up what it calls an office exchange, a large room divided by railings into spaces for some 32 tenants. It desired to rent out deskroom with unlimited telephone service—in fact, establishing itself as a wholesaler of telephone service. The company, defending its denial for such service, says:

> The rates fixed for telephone service of the various classifications obtaining in this country, are the result of careful scientific investigation, and based on the assumption that the service furnished under existing forms of contract is for the exclusive use of the party contracting for such service or his representative.

The issue at stake is an important one, as it will determine whether telephones can be installed in public places, for the general use of the public without making an extra charge. If the extra charge is permitted by the Utilities Commission, then the amount of this extra charge must be determined also, as the original franchise of telephone companies does not call for this extra service. This is the first time that the question has been before the Utilities Commission for hearing.

Application was filed November 23 by the Ohio State Telephone Company, asking for the consent and authority of the commission to the issue of a sufficient amount of its preferred capital stock to be used to acquire not less than 3,090 shares of the oustanding capital stock at the par value of $309,000 of the Akron People's Telephone Company, and not more than 4,110 shares of the outstanding capital stock at the par value of $411,000 of the Akron People's Telephone Company, such acquisition of stock to be made by purchase, upon the basis of 45 per cent of the par value of the capital stock, or by exchange upon the basis of the par value of the preferred stock of the Ohio State Telephone Company and a value of 45 per cent of the par value of the stock of the Akron People's Telephone Company.

After hearing the evidence and examining the exhibits the commission granted the petition.

A joint application was filed October 29 by the Newark Telephone Company and the Brownsville Farmers' Telephone Company, asking for the consent and approval of the commission for leasing to the Newark Telephone Company all the property of the Brownsville Farmers' Telephone Company for a period of 99 years, the consideration to be paid the Brownsville Farmers' Telephone Company by the Newark Telephone Company to be 6 per cent per annum, payable semi-annually, upon a valuation of $1,584.16 and the assumption by the Newark Telephone Company of an indebtedness of the Brownsville Farmers' Telephone Company of $4,200.

After considering the pleadings, hearing the evidence and examining the exhibits, and it appearing that the public would be furnished adequate service for a reasonable rate, and further that the service furnished the public would be improved, the commission granted the petition.

In the case of Edward C. Hoyer, complainant, versus the Cincinnati and Suburban Bell Telephone Company, defendant, pleadings and evidence were argued by counsel and the commission being fully advised in the premises found that the rule and regulation of defendant company requiring telephone rental charges to be paid quarterly in advance was a reasonable rule and regulation and not in violation of law.

The Home Telephone Company of Ohio, Pike county, operating central exchanges at Waverly, Cynthiana and Sinking Springs, and David R. Forgan, Edgar S. Bloom and Frank F. Fowle, receivers for the Central Union Telephone Company, on October 29 filed their joint petition, asking for the consent and approval of the commission for a retention of the connecting arrangement between the telephone systems of the Home Telephone Company of Omega and the Central Union Telephone Company and the continuation of an interchange of service between these companies.

After considering the pleadings and examining the exhibits it appeared that the service furnished the public would be improved, and further that the public would be furnished adequate service for reasonable rates, rental or toll charges, and also that no increase in rates nor diminution of service would result, the commission was satisfied and ordered that the petition should be granted.

Oregon

That rates be fixed so the profit of the company cannot fall below 8 per cent, was a request made by the Pacific Telephone and Telegraph Company at a hearing before the State Railroad Commission. The commission some time ago, upon its own initiative, began an investigation of the affairs of the company with a view of determining what the rates in Oregon should be. It is the most important telephone probe ever made in the Northwest.

It is the plan of the commission to determine the

physical valuation of the company's property and to adjust rates accordingly.

The commission has under consideration, too, the $5 deposits required by the company of new subscribers for telephones. Asked by Commissioner Atchison if the company should not return to subscribers the actual return from the use of these deposits, the company's counsel said it should not, and that the 6 per cent interest allowed was satisfactory. He said that the $5 deposit was based upon the average cost of abnormal service. Such service consists in a discontinuation of the telephone by the subscriber before the year expires.

Decision to make a thorough investigation of the affairs of the company was reached by the commission after receiving numerous complaints regarding deposits and character of service.

Michigan

The merger of the Michigan State Telephone Company properties in Branch and St. Joseph counties with those of the Southern Michigan Telephone Company has been authorized by the Michigan Commission. As a result, the independent company takes over the interests of the Bell and the Southern Michigan comes in control of the business in these two counties.

The department of justice at Washington has rendered an opinion in which it was held that the merger is not in violation of the Sherman anti-trust law and which places the railroad commission in authority to allow consolidation of telephone companies without danger of violating the federal law.

This gives the commission one of the most sweeping authorizations made in recent years and paves the way for the commission to allow mergers that have been tied up for a year pending the decision of the department of justice.

The merger will not give the Bell interests a greater hold in Michigan. In fact, their holdings will be less.

Nebraska

The Railway Commission is now confronted with a question of its right to shut out competition and prevent duplication of telephone exchanges. It has commenced the taking of testimony in the mater of the application of the People's Telephone Company of Sterling to issue $50,000 of stock. The company was organized for the purpose of building a telephone exchange at Sterling. The Lincoln Telephone Company has an exchange in operation there and is serving the community. It has filed an obection with the Railway Commission, alleging that a duplication of telephone property at Sterling will result in loss to the stockholders of both companies. It asks the commission to decline to grant permission to the new company to place its stock on the market.

The new company has filed an answer to these objections in which it denies the allegations made and asserts that the Lincoln company is giving poor service and that people are dissatisfied with its rates. The new company alleges the Lincoln company has not availed itself of the order of the commission issued last year, which permits the company to cut off free county service with the exception of one additional exchange for each community. It is alleged the Lincoln company is still giving free county service to people of Sterling, but is not giving this to other towns. Commissioner Hall personally believes the commission has authority under the constitution and the stock and bonds law to say whether or not there should be a duplication of public service corporations in a town. He is not willing that rulings made by a majority of the commission should go out as the opinion of the entire commission.

The commission will take testimony in the Sterling matter.

Maryland

Public hearings in the telephone investigation will begin January 13, according to an announcement made by the Public Service Commission. It is expected that the investigation will have been concluded by the middle of February, even allowing for lapses of certain days in the hearing.

Osborne I. Yellott, people's counsel, who has been preparing for the investigation for some time and who will conduct it upon behalf of the people, will confer shortly with J. L. Swayze of New York, general counsel for the telephone company. They will determine upon the days for hearing which will be agreeable to both.

Oklahoma

The Pioneer Telephone Company and other telephone concerns operating for hire are required to make monthly, semi-annual and annual reports to the Corporation Commission, giving separate financial statements as to toll and exchange service, according to an order of the commission. The order becomes effective as soon as service is secured on the companies.

The order requires all telephone companies operated for hire to maintain uniform accounting systems, such as have been prescribed by the Interstate Commerce Commission and which became effective January 1, 1913. The monthly and other reports required must be made for each exchange in the state and shall be divided between toll and exchange in such a way that the total labor and material charged to each department may be clearly shown. The records must so be kept, according to the order, as to reveal the revenues from each of these branches of the service and all reports must be made under oath.

At the hearing on the order the Pioneer Telephone Company objected that making the reports would entail a large and unnecessary expense on the companies, and that the benefit to the state would be small. The commission, however, in its order states that many complaints are filed by independent telephone companies alleging excessive rates for toll service and charging that they are given insufficient revenue by the Pioneer and other companies for switching and exchange service, and that it becomes necessary therefore for the commission to be able to determine these questions by knowing something of the earnings of the two main departments of the telephone business.

New York

The telephone rate revision inquiry before the Public Service Commission, Second District, adjourned after counsel for the commission elicited testimony that the New York Telephone Company's earnings ran as high as 18 per cent.

Among the interesting points that may be raised at the next session of the inquiry will concern the reason why the New York Telephone Company pays 4½ per cent of its earnings to the Bell Telephone Company. The question of the disposal of moneys raised on the company's several bond issues as well as the sources of the company's income generally will be examined.

Utility Regulation

Address Delivered Before the Conference of Mayors at Philadelphia

BY NATHANIEL T. GUERNSEY*

WHEN Mayor Carter H. Harrison of Chicago and I were law students together, Honorable Edward J. Phelps, then one of our professors, and later ambassador at London, told us one thing which I still remember, namely, that it is very difficult to make a thing clear to anyone else if you do not know anything about it yourself. The first step in the consideration of any question is a clear comprehension of just what that question is.

Regulation, in the sense in which the term is used with reference to public utilities, means to subject to rules, restrictions or governing principles.

These rules must be general and fundamental, and should not attempt to cover the details of management. The supreme court of the United States not long ago said (209 U. S. 118):

> It must be remembered that railroads are the private property of their owners; that while from the public character of the work in which they are engaged the public has the power to prescribe rules for securing faithful and efficient service and equality between shippers and communities, yet in no proper sense is the public a general manager.
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> Subject to the two leading prohibitions that their charges shall not be unjust or unreasonable, and that they shall not unjustly discriminate so as to give undue preference or disadvantage to persons or traffic similarly circumstanced, the act to regulate commerce leaves common carriers, as they were at the common law, free to make special rates looking to the increase of their business, to classify their traffic, to adjust and apportion their rates so as to meet the necessities of commerce and of their own situation and relation to it, and generally to manage their important interests upon the same principles which are regarded as sound and adopted in other trades and pursuits.

The public may not undertake the management of these properties because their management is not a public right or a public function; but that the public not only may, but should, establish such fundamental rules or principles as a basis for management and operation as are necessary for its protection, and for the protection of the utility as well, is not now generally controverted. The experience of the last fifty years has demonstrated that competitive utilities in the same municipal field are not the solution of the question, and that the normal, and generally inevitable, consequence of such a situation is consolidation, frequently preceded by the insolvency of one or more of the utilities in question. As a consequence, the public utility laws adopted within the last few years in a large number of states have established a general public policy which negatives the desirability of such competition.

The questions relating to the regulation of public utilities are important and are growing more so every day. The investment in the United States in the utilities affording service to single communities, such as water, gas, electric light, street railways and local telephone exchanges, excluding railroads, interurban railways and long distance telephone lines, is estimated at nearly nine billions of dollars. By far the greater part of this enormous investment is made up of the savings of hundreds of thousands of frugal people. The service furnished touches, directly or indirectly, not only the pocketbooks but the comfort and convenience of nearly every dweller in every municipality in the country.

The relation between the utility and the public is essentially that of buyer and seller. What the public wants and demands is, first, good service; second, the widest possible extension of this service; and, finally, a fair price. These requirements have been stated in what I believe to be the order of their importance from the public point of view. The thing of greatest moment is that the service be good, in the broad sense that includes efficiency, and everything from courtesy to the character of what is furnished, which is essential to fully meet all reasonable public demands. What comes next is that this service be made available, so far as practicable, to every person in the municipality who desires to utilize it, with only such limitations as must necessarily inhere in the question of cost. Finally, there remains the matter of a fair price.

From the standpoint of the utility, if it is to fulfill these public requirements, there are two things which are absolutely essential. The first is that there be a return from its operation sufficient to constantly attract the new capital which is continually necessary. Anything short of this is less than a reasonable return, and must inevitably result in confiscation. One of the most common and most misleading errors in the consideration of these questions is to treat a public utility in a growing American city as a completed investment. The investment is never completed. When the plant has been finished and begins operation, the investment has only started. There must be constant additions to it, if the property is to keep pace with the growth of the community, and its obligations to the community are to be performed. These additions demand an unceasing stream of new money, which can only be secured from the general supply of funds seeking investment. This general supply of funds is the aggregate of the public's savings, which the public desires to reinvest. The present remarkable facilities for transportation and for communication are such that neither those seeking investments nor those seeking funds are limited to their own communities, nor, in the case of the larger enterprises, to the United States. This has recently been brought sharply home to us by the desire of foreign holders of American securities to realize upon them, on account of the financial conditions caused by the present European war.

This general market to which the public utilities and all other enterprises desiring to obtain money must go is in the very nature of things a highly competitive market. Those who have money to invest will invest it where, all things being considered, it will bring to them the highest return. It will go to the highest bidder. Today, and in the near future,

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public utilities, for the money which they require, must compete not only with all normal demands, but with the enormous abnormal requirements due to the war. Investments in public utilities, just exactly like investments in real estate, manufacturing, banking and everything else, must be attracted by a prospective profit, and this profit, taking into account hazards and other conditions, must be equal to that offered by other available investments. Otherwise, the investors who are seeking a profit will not divert their investments from more profitable enterprises to public utilities. To secure normal, natural business conditions, the profits to be derived by the investor from the various channels of investment must be equal when the variations in hazards and other material conditions are taken into account. When this condition exists, each class of investments will normally secure its proper proportion of the general supply of money. If one class of investments is temporarily more profitable than another, money will flow into that class until, through the operation of the laws of demand and supply, it is brought into its proper relation with the others. The contention that because money invested in public utilities is devoted to a public use, it is therefore not entitled to relatively the same return as private investments, the conditions, hazards and other factors affecting the investment being considered, will never be sound as long as the laws of demand and supply remain effective. To secure money for investment in public utilities, it is necessary to pay what it is worth in the market, that is, as much as some one else, with a not less attractive investment, will pay for it.

The second essential, from the utility standpoint, is that freedom in the transaction of their business which is necessary to progress, and to efficient, economical operation, and that this freedom be not unduly restricted by attempts at so-called regulation, which are not in fact regulation, but are efforts to control the details of management and operation. The utilities are essential to the public. The public is just as essential to the utilities. The public welfare requires that the interests of each be protected and that the rights of neither party be violated. What tribunal should stand between the buyer and seller and maintain the scales in equilibrium?

Regulation costs money. It is not an over-statement to say that millions of dollars are being spent every year for this purpose in the United States. In the ultimate analysis this burden inevitably falls upon the public. It is an item in the cost of the service. To justify what it must pay for this regulation, the public must derive benefits more than equal to its cost.

To make regulation of benefit to the community, and to justify the enormous expense which it imposes upon the public, several things are necessary:

1. The regulatory body must be composed of men of unquestioned integrity and force of character.

To make regulation worth anything, the regulatory body must have, and this means it must earn and be entitled to, the respect and confidence of both of the interested parties, so that its conclusions, even though unacceptable, will be promptly accepted both by the public and by the utilities which are affected by them. It must, as far as possible, be free from all influences which would militate against a just, impartial, businesslike administration.

2. The men composing the regulatory body must have not only the capacity but also the business and special training necessary to the proper determination of the important and intricate questions which are presented to it.

The successful management and operation of a public utility require ability of the first order, combined with special training and experience. The regulatory body, while not engaged in management or operation, must be able to thoroughly understand all of the questions presented by management and operation.

3. The regulatory body should be composed of men who are free from other interests and engagements which would tend to prevent their giving to the performance of their duties the time which is requisite if sound results are to be obtained.

The value of the results attained will vary in almost direct proportion with the approach to meeting these requirements.

If these general considerations are sound, the conclusion is inevitable that the regulation of municipal utilities should be not local but in the hands of state commissions. The municipality is the representative of the buyer. The identical considerations which prohibit the utility from being an arbiter between itself and the public, negative the propriety of local regulation. No man may or should sit as a judge in his own case.

I have no sympathy with the unwarranted attacks which are so frequently made upon the integrity and capacity of city officials and members of city councils. The public selects them, and it does not lie in the mouth of the public to discredit the men whom it has selected. But these men are elected. They are inevitably subject to constant, direct, most persuasive political influences which they cannot ignore, and which they ought not to ignore. They regard themselves as the representatives of the public, and they would be unfaithful to the trust which is reposed in them if they did not.

But these very considerations which should be the subject of commendation and not of criticism disqualify them to act as judges in matters in which they, as individuals, and the public generally are directly interested. The decisions of such tribunals can never inspire confidence. A decision in favor of the public is immediately criticized as due to political considerations. A decision against the public arouses suspicion as to considerations of a different character, and a compromise is criticized as political.

Moreover, members of city councils cannot in the very nature of things acquire the special knowledge and experience necessary to the correct determination of the many varied, intricate and important questions which arise out of the regulation of public utilities. They are, in the very large majority of cases, men whose personal affairs must have their first consideration, and who can give, and are only expected to give, to the public business a relatively small proportion of their time and effort. They usually do not hold office long enough to acquire the experience necessary in order to make them efficient in the numerous special subjects involved in the regulation of utilities.

There has been criticism, much of it unjust, of the participation of public utilities in municipal politics. The utilities do not belong in politics; where they are in politics, it is not of their own volition, but because conditions beyond their control have forced them in. Their regulation by city authorities must

inevitably bring them into intimate relations with every political faction in the community. This always has been, and always will be, one of the results of municipal regulation.

State commissions, with the advantages of relative permanency in office, permanent staffs of experts and accountants and freedom from local political influences, have not been able to attain results with which they themselves have been satisfied. City councils or city boards which are subject to all of the difficulties which state commissions meet, and are subject to many from which state commissions are free, must, in the very nature of things, be less efficient and less successful as regulatory bodies than state commissions.

The local self-government argument is not a sound one. The public interest does not require the local authorities to do things which may be better done by others. If what it is desired to accomplish by regulation is to equitably adjust the differences which naturally arise between the public and public utilities, so that the public may have good service, widely extended, at a fair price, and so that the business of the utilities may be upon the stable basis which is necessary to enable them to render this service, and to make possible the development which is essential to the public interest, then there is absolutely nothing in the local self-government argument. The real question is, how can this regulation be best accomplished? If it can be best accomplished by the local tribunal, then it should be done by that tribunal, not because it is local, but because it is best. If it can be best accomplished by a state tribunal, then the public should have the state tribunal and should not take something that is not as good, in order to have this work done locally.

There are some things which cannot be accomplished by regulation, and it is well to have this clearly in mind. The idea seems to be more or less prevalent that the function of regulation is to decrease prices and impose burdens upon the public utilities. Every burden upon a public utility is a burden upon the public, which in the final analysis must pay the bills. If the burden brings with it a benefit that is worth to the public what it pays for it, the public can afford it. Otherwise, it cannot.

Rates cannot be indefinitely reduced by regulation. The downward tendency in rates that has been constant in recent years has been partially met by economies brought about through efficiency in management and operation; but there is a limit to what may be accomplished by such economies, and if this limit has not already been reached, it will be soon.

But what it is desired to emphasize is, not that existing rates are low, but that neither by regulation nor by anything else can the public buy this service for less than it is worth; that neither by regulation nor by anything else can the public, speaking broadly, have this service without paying for it what it costs, including as a part of that cost a reasonable profit upon the money invested in furnishing the service. Nobody has ever been able to get something for nothing for long. Ever since trade commenced, the cost of any article, or of any service, has been an important factor in fixing its price. The farmer cannot raise and sell his cattle and hogs and grain for less than they cost; the manufacturer cannot manufacture and sell his product for less than it costs; the merchant cannot buy and sell his merchandise for less than it costs. To attempt to do this is to invite bankruptcy. Public service corporations are not exempt from the operation of general, fundamental, economic laws. The operation of these laws makes it impossible for them to furnish service for less than it costs, this cost including, as has been said, the profit that is necessary to secure the requisite capital. Regulation cannot change these laws. Regulation cannot enable a public utility to buy rails, or cast iron pipe, or copper, or labor at less than it is worth in the market. Regulation cannot enable a public utility to buy money at less than it is worth in the market. And until regulation can do this, it cannot secure the service of these utilities for less than it is worth. Unjust regulation might wreck some public service corporations. Unjust regulation might drive public service corporations out of business, but for it to enable the public to secure something for nothing, to secure a service for less than it is fairly worth, is an economic impossibility.

There is an important corollary to this proposition. An insolvent public service corporation never gave good service. It never gave good service, because it is not within the power of such a corporation to give good service. A notable illustration of such a situation is afforded by the conditions surrounding the street railroad traffic in Chicago a few years ago, before an adjustment was made between the companies and the city which enabled the companies to secure new money. Only a prosperous public service corporation can furnish good service, because good service requires money. Money is necessary to secure an adequate number of competent employes; it is necessary to maintain the property in the condition which is a prerequisite to first-class service; it is necessary to make the replacements, renewals and additions which are required if the plant is to be adequate and up-to-date, instead of inadequate and obsolete; it is necessary to provide for the additions and the surplus capacity which are absolutely essential if the public is to have the service when it needs it and where it needs it. It cannot have it without paying for it, simply because a public service corporation, just like a farmer or a manufacturer or a merchant, cannot live without a profit.

The matter of the regulation of municipal utilities is still in the development stage in this country. This is true, both as to the law and as to the practice and procedure. If this development is to result in successful regulation—and by successful regulation I mean something that will contribute substantially to the welfare of the public as a whole—this must be accomplished through the co-operation of the public and the public utilities, with a frank recognition of the principles which have been discussed. It should result in good will, decreased cost and increased efficiency.

No Discrimination for Cotton Buyers

Construing the anti-pass law, Assistant Attorney General Luther Nickels has held, according to a dispatch from Austin, Texas, that telephone companies can not lawfully give reduced rates on conversations to cotton buyers, even though the talk is limited to market quotations. The fact that the conversaion is for the purpose of getting quotations can no be used as a basis for a reduced rae. Such use would maket is a discrimination against other patrons.

The Right to an Education

A Popular Talk on Some Features of Law Not Universally Known Among the Laity

BY WALTER K. TOWERS

THE American public school is undoubtedly one of our most important institutions. No branch of government comes more intimately into contact with all of us, and so it is that affairs relating to public education are of importance to almost every person.

Almost everywhere the government provides schools for its young citizens. Education is the function of the state, and so it is the state that provides for public schools. The legislature enacts the laws which provide for those schools and by which they are governed. The school district is a political subdivision of the state, organized under state law.

One theory of the public school is that a state provides schools in order that its citizens may be trained to become useful members of society, capable of being self-supporting, profitable members of the community instead of a burden to the state. It is further recognized that intellectual enlightenment is necessary if our democratic form of government is to succeed. The future voter must be educated. And so it is that the state not only provides free schools, but further requires that residents within the school age attend school. Another theory of public instruction is that it is a sort of mutual benefit arrangement by which all join together to share the expense and thus secure greater efficiency at a lower relative cost.

But whatever the theory of the reason for the public school most parents desire that their children attend school, and a majority of children probably appreciate the advantages of an education. So there is usually a desire to attend school and the question frequently arises as to the rights of a child to attend school. These questions frequently find their way into a court of law.

Generally speaking a child of school age who is within the rules of eligibility prescribed by law, and is a resident within the school district is entitled to attend the public school in that district without charge. The school laws of the state usually fix upon the school authorities of the district the responsibility of providing reasonable and convenient accommodations and opportunity for instruction. These privileges are open to all who are legally entitled to attend the schools and who wish to do so.

As has been before stated the school system is conducted by the state and so is within the control of state law. So it is that the right to attend school depends upon the laws passed by the legislature. Under the laws in force in most of our states the right to attend the public school depends primarily upon residence. The resident child may attend the public school without cost; the child who is not a resident may be refused entrance, or may be charged a tuition. The residence of the child is generally that of his parent or guardian. The residence necessary to secure the right to attend school need not be a legal domicile, but any genuine residence of ordinary permanence. If a parent moves into a school district for the school season and only for the purpose of allowing the child to attend school in that district, the right will not be secured, and the child may be barred from school as a nonresident, or tuition may be charged. But, generally speaking, if the parents move into the district for other purposes, even though it be for a temporary residence during the school term, the child is regarded as a resident with the right to attend the public schools.

It is possible for a child to secure a residence apart from his parents and if this occurs the child has school rights in the district of his residence. A child who comes into a school district to make a permanent home with a family living there, it being the intention of his parents that he make a permanent home there, secures school rights. One does not secure a residence by coming into the district to live with others temporarily, or simply for the purpose of attending school there. The school board may accept nonresident pupils on such terms as it may fix—as the payment of tuition—if this does not interfere with the other pupils, who, being residents of that district have the first right to the school accommodations of the district.

Children of persons kept upon the county poor farm are usually held to be entitled to attend school in the district where the farm is situated. But the law frequently rules against the right of orphans or paupers at public institutions to attend the public school in the district where the institution is situated, especially where funds are provided for the education of young inmates. In some of our states a broader view is taken, however, and school privileges are freely extended to inmates of denominational orphan homes and similar charitable institutions.

The school board, or other officials in charge of the schools are allowed a wide discretion in the management of the schools and regulation of the pupils, except as restrained by the state law, and unless their acts are clearly unreasonable and prejudiced the courts will not interfere. The redress of a parent whose child has been illegally barred from school is by a legal remedy known as "mandamus." A parent who finds it necessary to take such steps to enforce his legal rights should consult a competent attorney.

A child cannot be barred from the schools altogether because of color, but separate schools may be provided if the accommodations are equal. The age within which pupils may, or must, attend school is usually fixed by state law.

Children have been barred from the public schools on the ground of immoral character even where no acts evidencing this have been committed in school. Proven immorality is recognized by the law as a proper cause for barring a child from the public schools yet some states require that evidences be presented during school hours before such action may be taken.

The matter of transfers often causes much difficulty, and in this the school board has a wide discretion, its action, unless clearly unreasonable and improper, being final. These matters are frequently regulated by state law.

Health regulations may be legally imposed upon attendants at a public school. The right to require vaccination of all pupils is generally held to be within the legislative power, and children who are not vaccinated as required may be barred from attending the public schools.

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Automatic Private Exchanges Gaining Recognition

Interesting Installations Recently Made

THE adoption of automatic telephone equipment for intercommunicating use has been very extensive, and never more so than during 1914. Not only in the United States, but in many foreign countries as well, firms and institutions of all sorts have installed this apparatus. In some cases this is for "house service" alone, in others the automatic system connects with the city telephone exchange, and is the only service in use.

In Sydney, Australia, for instance, two of the city's largest hotels, the Australia and Usher's, have ordered installations totalling nearly 400 lines. These are so designed that all "house" calls will be made by dialing 3-digit numbers. Calls going out to the city exchange will be trunked direct to an "A" operator by one turn of the dial. In-calls will be received at a trunking cabinet and distributed automatically there. Two other installations of a similar type have been ordered for the Royal Arms apartments and the Wassell apartments in Portland, Ore.

In Buffalo, N. Y., four of the largest department stores have installed automatic private exchanges which operate in connection with the Federal Telephone and Telegraph Company's system. By means of this apparatus, these firms offer what is called "Shopping by Telephone" facilities, which have proved very satisfactory to the companies and are much appreciated by their patrons. This plan consists of trunk lines in any desired number reached by dialing an advertised number. These lead to a board at which are located special order clerks, who greet those making calls, inquire as to their wants, switch them, by means of the dial, to the various departments with which the patrons wish to transact business, and, figuratively speaking, conduct the customer to the door and ask him to come again. The effect of installing this equipment has been greatly to facilitate the handling of telephone orders and a large increase in the volumes of such business.

A number of hospitals have also been equipped with automatic private systems, among which may be mentioned the Hamot hospital, Erie, Pa.; St. Mary's hospital, Rochester, Minn., and the Eastern hospital for the insane, New Spokane, Wash. In the same class is Mortimar Singer's country estate in England, which has been turned over to the Red Cross for the handling of convalescents, and where automatic intercommunicating service is proving invaluable.

A long list of banks, manufacturing concerns and commercial organizations are included in those which have ordered automatic intercommunicating systems during the past year, while the Chicago and Northwestern, the Chicago and Western Indiana, the Pennsylvania and the Kansas City Terminal Railway Company are among the transportation companies to equip their offices, terminals and shops with the automatic.

The system in use at the Kansas City Terminal is particularly interesting and may be described in detail as follows:

For general service in the offices and along the line, a 300-line automatic telephone system, with 200 lines equipped, is in use. These telephones are installed under all kinds of conditions. Some of them are used in the officials' offices, some in the repair shops, some are in iron boxes on the terminal platforms, some in siding boxes along the right of way, some in manholes, for use by testers.

The Automatic Switchboard and Power Board, Kansas City Terminal.

In addition to the general board which takes care of the regular business of the officials, trainmen and shopmen, the terminal officials have installed a 100-line automatic system, with 50 lines equipped, for train operation only. These telephones are installed in the towers, on platforms, in the engine room, in the manholes, at sidings, at the gates, in the waiting room, and at various other points. This system is used solely for matters pertaining to the movement of trains and there will be no interference in conducting the business due to other conversations.

Several different types of telephones are used on these systems. At the gates a hand set, with a dial espe-

cially provided, is used. These hand sets are hung up in little alcoves in the wall, a separate alcove being provided for the hand set and the bell. They are very convenient, being right at the hand of the gate tender, so that he receives information of the approach of the train from the tower before it is actually at the station, and receives information of any delay of the train departing or arriving. He receives instant information when the train is about to depart and at the moment that it does depart, so that there is no confusion in advising patrons as to the proper time, and whether they have time to make the train or not.

In the manholes are waterproof jack boxes and each tester is provided with a hand set equipped with a dial for calling and both the operating board and the general board have terminals in these manholes.

For use on the platforms iron box sets are provided with special automatic telephones, so arranged that they are protected from the weather, but at the same time are easily accessible for operation.

In the engine room there is provided a large gong for attracting the attention of the attendant, and lamp signals for indicating which telephone is calling, there being three distinct telephone calls for this station.

In the towers a similar arrangement of telephones is provided. Each tower is equipped with lamp signals and jack boxes for making connections. The lamp signals are divided into different colored lamps, so that there can be no confusion in answering the proper telephone.

In addition to the above arrangement the terminal belt line is equipped with automatic train dispatching equipment, which is especially adapted for service of this kind, as it is rapid, reliable and economical. The dispatchers at the present time are not located at the terminal proper, but are located at Sheffield avenue, about four or five miles out. These dispatchers are handling not only the 300 passenger trains which go through this terminal daily, but all interconnecting freight trains and the freight yards where these trains are made up. The loss of a few minutes on any call, or the delay of any train entering or leaving this station or these yards means a loss of time of employes, and a loss of a considerable amount in actual money, due to these delays; because a delay of one train, when they are as frequent as they are in these yards, means a delay of several other trains, and would probably throw off the entire schedule for five or six hours, so that speed and accuracy are the most essential features to be considered.

There is also an installation of an automatic intercommunicating system of 25 station capacity, with 20 stations equipped for the Fred Harvey Company, for its restaurants, drug stores, cigar stands, fruit stands, dining room and souvenir booths, as well as the kitchens, etc. This system is entirely distinct from the others.

In addition to the above equipment the telegraph office of the terminal company is equipped with automatic equipment throughout. All telegraph calls for the Kansas City Terminal come in on selectors. The operation of these selectors lights lamps in front of telegraph operators, who pick up the calls by plugging in and connecting their automatic telegraph relays and sounders with the line. There are three quartet tables, and one two-position table, each table being equipped with 30 telegraph lines and 20 telephone lines. The lines are capable of being connected to any table or any position on any table from a test board which is taken care of by the office manager or wire chief, and the traffic is thus evenly distributed over the positions occupied at present.

Telegraph Operating Room, Kansas City Terminal, Installed by Automatic Electric Company.

Entering this office are also 15 or 20 telephone train dispatching circuits, which are arranged to come in on their respective selectors. There are no less than five different kinds of selectors, all of these connected with the automatic apparatus and operating very satisfactorily. These lines also pass through the wire chief's test board, and are capable of being switched to any position desired. They are used ordinarily, however, on the counter or two-position table, as most of the train information comes to this table, which is located at the counter where the trainmen come to get their notes, sign their orders, etc. The equipment of this office is unique and ideal in its arrangement.

Keystone Reports Increase in Earnings

The Keystone Telephone Company, Philadelphia, Pa., reported gross earnings for November of $109,778, an increase of $2,446 over the same month last year. For eleven months the gross was $1,211,674, an increase of $53,590, while the surplus was $328,672, an increase of $37,281.

Of Interest to the Trade

What the Telephone and Accessory Manufacturers Are Doing to Advance the Art

NATIONAL INDEPENDENT TELEPHONE ASSOCIATION'S CONVENTION IN FEBRUARY.

The National Independent Association will hold its eighteenth annual convention at Hotel La Salle, Chicago, February 3, 4 and 5, 1915. A very interesting program is being prepared and a large attendance is expected.

Kellogg Equipment for Hillsboro, Ohio

The Hillsboro Telephone Company of Hillsboro, Ohio, has purchased a new central office equipment to replace its four-position, common battery switchboard. The new equipment will consist of an eight-panel, three-operator position, multiple section, having an ultimate capacity of 1,200 common battery lines with an initial installation of 440 common battery lines and 30 rural lines. The common battery lines will have multiple lamp signals and will be available for answering by any operator.

The two subscribers' positions are to be arranged with cord circuits which have no listening keys, the operator's telephone set being connected for answering by the insertion of the answering cord, and disconnected by the insertion of the calling cord, thus providing automatic listening. Four-party harmonic automatic ringing, automatic peg count, secret service, instantaneous disconnect and instantaneous recall are other features.

On the rural lines it will not be necessary for the operator to discriminate betwen the uses of the different cords, as they are automaticaly adapted to the classes of service to which they are connected. This makes team work possible, for the rural operator can answer and connect common battery lines with the same advantages obtained in the regular cord circuits. These cord circuits are to be arranged with a listening key and can be used to listen in only on rural connections.

This equipment will be installed by the Kellogg Switchboard and Supply Company.

A very interesting and convincing demonstration of the Adsit lock-out system in the editorial offices of TELEPHONE ENGINEER calls to mind the fact that this clever device has received a great deal of popular publicity lately. Even the *Saturday Evening Post* recently contained a detailed description of its operation, easily recognized, although the name of the Adsit General Electric Company of Minneapolis was not mentioned. It is not often that a telephone accessory gets that kind of advertising.

Recently received bulletins (Nos. 806 and 813A) by the Leeds & Northrup Company, Philadelphia, describe respectively the Bureau of Standards Calorimeter Thermometers and Resistance Thermometers for electrical machinery.

Unique Intercommunicating Telephone System

An intercommunicating telephone system, designed to complete the convenience of the call bell usually found in large and small residences for summoning the servants and other members of the household has recently been developed and placed on the market by the Western Electric Company. It is known as the No. 16 Interphone system and provides service between a master-station in the kitchen, butler's pantry or other convenient place and outlying stations in the various rooms and halls.

The unique feature of the new system lies in the fact that when a house is wired for call bells and annunciators it is possible to provide for a future intercommunicating telephone system at a very slight additional cost per station. Instead of the ordinary commercial type of call bell push button, a wall box receptacle and a two-hole wall plate, the same as those used for electric lighting switches, are installed at each station where intercommunicating telephone service will be required. The wall box is fitted with what is termed an apparatus unit, consisting of the push buttton with a set of springs and a jack. The two-hole wall plate fits over this, the upper hole engaging the push button and the lower one coming directly over the jack. No other wiring than that which would be installed for the usual call bell system is used. This is true where all stations are to be used for interphones or only some as interphones and others as call bell stations.

The interphones used with this system are of the hand set type with receiver and transmitter mounted on a single handle. The handle is equipped with a grip push bar which is operated by grasping the handle firmly. The operation of this grip opens one contact and closes another, performing the function of a switch hook. This makes it possible to put down the interphone in any position when not in use without having it consume battery current.

The hand set is equipped with a three-foot cord, which has a pear-shaped plug fitted to it. This plug fits into the jack in the apparatus unit and is made with a metal hook, on which the hand set is hung when it is not in service. Hand sets equipped with extension cords are also available, so that the hand sets can be carried to a bedside in case of illness. This cord is eight feet long, which, together with the other cords, gives a total length of eleven feet.

If intercommunicating telephone service is not required at the time, the ordinary bell, buzzer or annunciator wiring is installed the contractor can prepare for a future interphone installation by installing the wall box, apparatus unit and face plate in place of push buttons and a service annunciator for the future master station. This will give a straight bell or buzzer installation which can be used for telephone service when desired.

The only equipment required to change this bell or buzzer system to a telephone system is a hand set for the annunciator, which can be fastened by means of a screwdriver, and a hand set for each of the outlying stations. It is only necessary to insert the plug of the hand

set into the jack of the apparatus unit to convert the system to a telephone system.

As in ordinary annunciator systems, two classes of service can be supplied. One-way calling, for which only two wires, one common and one individual, are necessary, and two-way calling, for which three wires, one common and two individual, are required. With one-way service it is only possible to call from the outlying to the master station. With two-way service it is possible to call both ways between the master and outlying stations.

Industrial Plant to Install System

The relation of the telephone to efficiency in the management of the industrial plant has become so well understood that there is an ever-increasing number of such plants using the telephone for expediting the carrying on of business routine. In recognition of this fact, the J. I. Case Threshing Machine Company of Racine, Wis., is preparing to put in operation an unusually complete private telephone system.

This company operates an exceedingly large plant in Racine, the principal buildings of which are about half a mile apart. In order to serve both parts of the organization in the most satisfactory manner, two complete switchboard equipments are to be installed. The switchboards, which will be of the Western Electric No. 1261 central battery, private exchange type, will each have an initial equipment of 80 lines with capacity for additional lines to take care of future growth. Complete power plant, ringing, terminal protective equipment will be used in connection with each switchboard.

The two private exchanges will be connected by means of trunk lines running in lead-covered cable. They will not, however, be connected to the city telphone service, as the lines are to be used exclusively for internal business communications. Certain officials of the organization will, of course, require service outside of the plant, and for this purpose a separate private branch exchange switchboard will be operated in connection with the local telephone company's lines.

Lead-covered cable will be used for the main distributing lines and twisted pair telephone wire for the wiring from the distributing points to telephone instruments. Three thousand feet of 25 pair and 12,300 feet of 50 pair cable will be installed. There will be outside distributing points on the grounds, at which cable terminals will be located. Loud ringing bells will be placed at various points inside and outside of buildings to call officials to the nearest telephone. These bells can also be used to sound alarms.

All telephone and construction material will be supplied by the Western Electric Company.

Efficiency Over the Counter

In an Illinois city of 26,000 inhabitants is a merchant who does 50 per cent of the grocery business of the entire town. This merchant and his methods were recently the subject of an interesting article in the *Saturday Evening Post* by Forrest Crissey. The way the Schmidt store handle telephone orders is set out in instructive detail.

The first step in the practical application of this view of service, as it is seen in Franz Schmidt's store, is the telephone department. Here the telephone is not handled as an incidental accessory, but as a selling agency of the first rank, which must be treated with the respect and care calculated to develop all its possibilities. According to Mr. Schmidt and his lieutenants, taking orders over the telephone is a specialty, a distinct branch of salesmanship that should, so far as possible, be handled by persons who look at it in this light and who give their exclusive attention to this feature of service.

Though almost every counter in the store has a telephone, so that a customer who prefers to do business with any particular clerk may be accommodated, there is a telephone order desk, at which a son of the proprietor and an assistant spend practically all their time.

They must have a better knowledge of the stock on hand, of incoming stock and of prices than the clerks on the floor, as they must be able to answer all inquiries without leaving the telephone desk.

On a busy Saturday more than a thousand orders are taken by telephone at this store, and sometimes the number is close to twelve hundred. This means rapid-fire salesmanship; and there can be no hesitation in price quotations or in information regarding the quantity or quality of goods on hand.

"No," says the telephone salesman; "I can't recommend the raspberries this morning. They are not up to your requirements; but we have choice eaarly blueberries, and tomorrow morning we shall have a shipment of red-caps that are sure to be prime."

This merchant's instructions are: "Be more conservative in your statements as to quality over the 'phone than you would be if the customer were personally present in the store and could see what you are selling. Make it so safe to buy of us over the 'phone that every housewife will feel that she can shop by wire to just as good advantage as though she made a trip to the store."

The telephone clerks are carefully coached not to permit themselves to lapse into mere order takers, but to remember that they are salesmen. They must learn which customers resent suggestions, and handle them accordingly, but, in general, the telephone salesman who allows a call to get past him without adding at least one article to the customer's list feels that he has failed to meet requirements.

Frequently the telephone salesmen reverse the usual order, take the aggressive and open up a selling campaign to move certain seasonable goods. This happens most frequently in the fruit-canning season, when a large shipment of fruit is received or when prices on an incoming lot are especially attractive. The telephone salesmen of this enterprising provincial grocery sell carloads of fruits every season by wire solicitation.

Philadelphia Electric Companies Bid for Conduits

Negotiations are under way for the sale or lease of the underground conduit system of the Keystone Telephone Company in Philadelphia. At least two distinct groups of capitalists are concerned, in addition to the telephone company, and the statement was made on high authority that the Philadelphia Electric Company is interested, directly or indirectly on one side and a possible competitor of that company on the other. Those in a position to know said that details could not be given for the present.

For years there have been periodical "deals" for the disposal of the unused portion of the Keystone Telephone Company's conduits, but nothing ever came of them. Their value to the Philadelphia Electric Company would lie not only in their use for electric cables, but also in preventing a possible rival from gaining a foothold in the city.

Brevities of the Business

The Activities of the Whole Telephone Field Told in Short Paragraphs

PERSONAL NOTES

P. M. Bone is the new manager of the Centralia exchange of the Pacific Telephone & Telegraph Company at Washington, succeeding B. L. Carson, who has been transferred to The Dalles.

Fred C. Wilcox, assistant chief clerk of the Nebraska Telephone Company in Omaha, was recently married to Miss Lillian Troth of Grand Island.

Charles E. Tarte, general manager of the Citizens Telephone Company of Grand Rapids, Mich., has been elected a director of the United Home Telephone Company of Muskegon and Ludington to succeed E. B. Fisher.

J. W. Carter of Gurdon is the successor of B. C. Burkehead, formerly manager of the Heber Springs exchange of Arkansas, for the Southwestern Telephone Company.

H. P. Hughes, manager for the Southwestern Telephone Company in Denison, Texas, has been transferred to Teague, and C. C. Kirby of that place will come to Denison and assume the place made vacant by Mr. Hughes' removal.

D. V. Bradley, manager of the Brockport exchange of the Bell Telephone Company of New York, has been transferred to Wellsville.

Taking effect January 1, W. E. Harkness of the Hall Switch and Signal Company, New York, and E. E. Backus, representing the same interests at Chicago, have resigned their positions.

At a meeting of the Rochester Telephone Company, W. W. Miller of Wellsboro, Pa., was elected to fill the vacancy in the directorate caused by the death of Robert R. Hefford of Buffalo.

George A. Hills of Sioux City, Iowa, has succeeded to the management of the New State Telephone Company in the Sioux Falls, S. D., district. George H. Dodds was formerly manager.

A. O. Sheaff of Fullerton, Neb., is the new manager of the Alliance exchange of the Nebraska Telephone Company.

C. H. Webb, for many years general manager of the Pike County Telephone Company at Washington, Ind., has resigned his position and Fred E. Stewart was elected to succeed him.

Walter M. Boaz, who for the past ten years has been the manager of the Bristol Telephone Company in Johnson City, Tenn., has tendered his resignation because of ill health.

General Thomas Sherwin, formerly president of the New England Telephone and Telegraph Company and well known in Chicago, died at his home in Jamaica Plain, Mass., December 20, aged seventy-five.

L. W. Howell has succeeded M. C. Moredock as district manager of the Southwestern Telephone and Telegraph Company at Hannibal, Mo. Mr. Moredock has been transferred to the general office of the company at St. Louis.

Julius Andrae, president of the Julius Andrae & Sons Co., Milwaukee, Wis., celebrated his eighty-fifth birthday December 2. He has built up the large business of the company from a very small start in 1859 with $50 capital.

J. W. Ryan, manager for the Southwestern Telephone and Telegraph Company at Hillsboro, Texas, has resigned.

J. A. Williams of Marlin, Texas, has been installed as district commercial manager for the Southwestern Telegraph and Telephone Company, with headquarters at Cleburne.

NEWS FROM THE FIELD

ARKANSAS

The Southwestern Telegraph & Telephone Company is now operating an up-to-date central energy system in Forrest City.

CALIFORNIA

In order to maintain better service and to take care of the increasing business, three new sections of switchboards are being installed in the Fresno office of the Pacific Telephone & Telegraph Company at an expense of several thousand dollars. The work of installation will not be completed until February 15, 1915, and is being put in with the idea of meeting requirements and increase up to May 1, 1917. The new switchboards will take care of 620 subscribers' lines or in the neighborhood of 1,200 new telephones.

Mayor Rolph of San Francisco has signed the telephone compromise ordinance, whereby the Pacific Telephone Company takes over the Home Telephone Company—the automatic system. The ordinance provides that the litigation which arose from the purchase of the automatic system be dropped.

CANADA

The Bell Telephone Company of Canada has declared the regular quarterly dividend of 2 per cent, payable January 15 to stock of record December 24.

COLORADO

The Mountain States Telephone and Telegraph Company is seeking a new franchise in La Junta. The city council held a special meeting recently to confer with the company's representatives, S. J. Elfred and D. L. Fauteaux, of Denver, and Robert Thorn, the local manager. The company asked for a twenty-year franchise and offered two per cent of the gross earnings.

CONNECTICUT

The Southern New England Telephone Company, of New Haven, was hit badly by the blizzard which recently swept over the northern and northwestern part of the state. Officials report that lines were crippled worse than at any time since 1888. Over a thousand repair men were out on the lines in every direction and over six hundred poles were down.

DELAWARE

Southern Telephone & Telegraph Co.—Conducting a telephone and telegraph business, capital, $50,000. Incorporators: T. W. Allen, Jackson, Tenn.; W. N. McAnge, Jr., W. H. Kier, Corinth, Miss.

IDAHO

According to J. A. Pearson, supervisor of the forest service, the new down-river telephone line is completed as far as Northfork. The line will be continued as far as Indianola to connect with the present forest line to Shoup, Blue Nose, Clear Creek, Leesburg, Forney and way points. At Northfork an exchange will connect with Hughes creek, Gibbonsville, Ulysses and down-river points.

ILLINOIS

The Interstate Telephone Company has completed hanging its new cable through Chatham.

J. B. Pittman of Rantoul is superintending the construction of a new telephone line from Penfield to Dailey.

The Central Union Telephone Company has a crew of men working here rebuilding a toll line between Springfield and Decatur.

Farmers' Bluff Telephone Company, Kinderhook: telephone business—J. H. Kuhlman, George W. Lawrence and William Blanser. Capital stock, $4,000.

The Chicago Telephone Company has declared the regular quarterly dividend of $2 per share, payable December 31, to stock of record December 3.

A special telephone exchange for doctors so they may notify Central when they leave their offices and have all calls transferred from one number to another, was advocated at a meeting of the Chicago Medical Association in the Hotel Sherman December 8. Alderman Willis O. Nance, Dr. Milton H. Mack and Dr. Albert W. Seidel were appointed a committee to urge the plan on the city council.

The Stronghurst Telephone Company has just installed a new two position Western Electric switchboard in the exchange here which affords Stronghurst one of the best equipped exchanges in this section of the state for a town of this size.

ILLINOIS

Farmers Mutual Telephone Association of Grayville, Grayville: Capital, $6,000. Incorporators—D. B. Hanks, John C. Hon, Lewis Stein and Charles L. Scott.

INDIANA

The Leport Telephone Company, the new owners of what is known as the Bell exchange here, are rebuilding the entire system. N. G. Feely, who has charge of the improvements estimates the work will cost $5,000.

The Odell Telephone Company of Shadeland has filed notice of preliminary dissolution.

IOWA.

George O. Gardner has sold the Humeston telephone exchange to D. C. Phillips of Indianola and Charles A. Long of Monroe. Possession was given December 1. Mr. Phillips will

be the business manager of the exchange under the new ownership, while Ray Valentine of Monroe will be the local manager.

The Chariton Telephone Company, Chariton; $10,000. Incorporators, W. B. T. Belt, Guy N. Pratt, G. J. Stewart.

Permission has been granted the U. S. government to construct a telephone line along the Hennepin canal from Milan to the Freeport locks. The petition for that right was presented by Major Hoffman of the U. S. engineer's office at Rock Island.

At a special meeting of the board of directors of the Western Electric Telephone, held at Mason City, it was decided to purchase a site and erect a building which, when fully equipped, will cost $150,000. The board of directors of the Western Electric Telephone Company are: C. E. Yost of Omaha, president of the northwest division of the Bell Telephone Company; W. B. T. Belt of Omaha, general manager of the Iowa Telephone Company, and T. A. Potter and B. C. Way of Mason City.

It is rumored that the Western Electric Telephone System will erect a building costing about $150,000 at Mason City next year.

KANSAS.

The Arkansas Telephone Company opened its new plant in Dodge December 4. The new plant cost $30,000 and includes a new two-story brick building.

Garden City is talking about a municipal system of telephones.

Managers of the various independent telephone exchanges in Reno county met at their semi-annual convention in the Commercial club rooms, December 8. President W. T. Wisecup of Haven presided over the meeting. No special business came before the house, the afternoon being devoted to shop talk and a discussion of the new war tax as it affects the telephone business.

The annual meeting of the Kansas Independent Telephone Association will be held in the National hotel, Topeka, January 5-7.

The accounting department in Hutchinson of the Missouri & Kansas Telephone Company for both the local and district offices will be located at Wichita after January 1, 1915.

The Haven Telephone Company has made application to the state public utilities commission asking to be allowed to discontinue service with the town of Yoder, ten miles southeast of Hutchinson.

KENTUCKY.

Fulgham Telephone Company, Fulgham; capital, $5,000. Incorporators: John W. Bostick, John W. Bone, V. S. Vaden and P. R. Humphrey.

MASSACHUSETTS.

New England Telephone & Telegraph Company, regular quarterly of 1¾ per cent, payable December 31 to stock of record December 16.

MICHIGAN.

Keweenaw Bay is to have a telephone system. The Keweenaw Bay Telephone Company has been organized by J. C. Crebassa and the work of putting up the poles is already in progress. The new concern will use Bell telephones and will connect with the lines of the Michigan State Company.

The Benzie Consolidated Telephone Company has purchased the telephone line running between Arcadia and Bear Lake, known as the Big Four line. It will be thoroughly overhauled and combined with the Consolidated lines. The Arcadia office has been fitted with a new switchboard.

After many months of delay the Valley Home Telephone Company of Bay City has closed a contract for its new switchboard, which will be the very latest thing in telephone construction. In addition to the new switchboard, the company will replace its outside open wire construction with aerial cable.

Through purchase, the properties of the Owendale Independent Telephone Company at Owendale and Gagetown have been added to the Valley Home Telephone Company.

MINNESOTA.

The farmers residing in the Morrison and Miller Trunk roads are making the preliminary steps toward the organization of a rural telephone company. A committee, which includes Herman Holmes and C. A. Morrison has been appointed to confer with Fred Lister of the Mesaba Telephone Company regarding the cost of exchange service through Eveleth.

The Northwestern Telephone Company has moved into its new $50,000 building at Twenty-second street and Emerson avenue, Minneapolis. The new exchange will be known as Kenwood and will serve five thousand patrons.

At a meeting in Winnebago of the telephone officials and operators of Faribault, Martin, Freeborn, Watonwan, Cottonwood and Jackson counties, an organization was formed to perfect traffic arrangements in this territory, and to consider matters of interest to the telephone companies and the public, in regard to service and the interchange of business. Fred A. Repke of Fairmont was elected president, and B. C. Hazle of Alden, secretary-treasurer.

The newly organized People's Co-Operative Telephone Company of Williams has crews of men distributing and setting poles. The company expects to have two or three branches of the line in operation before Christmas.

The Northwestern Telephone Exchange Company has made application for a permit to build an addition to its station at Dale street and Laurel avenue, St. Paul, to cost $35,000. The company will add another story to the building and make a two-story addition 32x37 feet.

MISSOURI.

The annual convention of the Missouri Telephone Association was held at the Coates House, Kansas City, December 9 and 10.

The Farmers' Mutual Telephone Company of Sheldon, Vernon county, filed a statement showing increase of its capital stock from $3,000 to $4,000.

MONTANA.

Farmers living north of Belgrade filed articles of incorporation in Bozeman for the Reese Creek Telephone Company, with W. J. Warwood, H. J. Gee and Charles E. Gray, all of Belgrade, as directors. The company's object is to build a telephone line between Belgrade and the H. J. Gee home on Reese creek.

More strands are being added to the web of telephone lines from Fairfield, Greenfields bench and Simms to Fort Shaw.

Articles of incorporation of the Wolf Creek Telephone Company, Lewiston, have been filed. The company is formed to construct and operate a telephone line on the west side and is capitalized for $10,000. The directors are A. J. Goyings, Robert Skinner and S. J. Gary.

NEBRASKA.

The Lincoln Telephone and Telegraph Company has commenced a series of improvements in their lines out of Weeping Water. The principal work is the re-routing of the toll lines from Weeping Water to Nebraska City and to Plattsmouth.

The Lincoln Telephone and Telegraph Company, Lincoln, paid its county personal taxes in the sum of $18,460.32.

NEW JERSEY.

James Kerney, receiver of the Interstate Telephone and Telegraph Company of New Jersey, has filed in the Court of Chancery his first report of operations covering the period from August 18 to November 30. Receipts were $75,502 and disbursements $42,803, leaving a balance of $32,699.

It was decided at a meeting of the stockholders of the Paterson, Passaic and Suburban Telephone Company, held in the chamber of commerce, Paterson, December 9, to reorganize the system and place it on a working basis. This action was taken after a special committee reported that a conference had been held with George F. Wright, receiver of the company. Another meeting will be held after some two hundred and fifty stockholders have been interviewed concerning the proposition now under consideration.

NEW YORK.

The New York Telephone Company recently filed plans for alterations, estimated to cost $15,000, to the six-story telephone exchange at 346 West Seventeenth street, between Eighth and Ninth avenues, New York.

The Afton-Middlebridge Telephone Company, Afton, has elected the following officers for the ensuing year: President, George Craver; vice-president, R. H. Searles; secretary, A. D. Pearsall; treasurer, E. W. Lingu; director for three years, Charles LeSuer.

At the annual meeting of the Crosby and Barrington Telephone Company, Penn Yan, the following officers were elected for the year 1914: President, Howard S. Fullagar; vice-president, Frank Crosby; secretary and treasurer, Herbert C. Ovenshire; manager, Samuel I. Thayer; directors, Frank Crosby, Howard S. Fullagar, Leland Sackett, Samuel T. Thayer, Fred Taylor, Charles E. Guile, Herbert C. Overshire.

NORTH DAKOTA.

The Northwestern Telephone Company has rebuilt its lines at Esmond and has moved the exchange into a building opposite the hotel.

Cottonwood Lake will soon have telephone service.

Farmers near Rawson will co-operate with business men of that place to build a telephone line to serve a large section of McKenzie county, an organization having been formed with this purpose in view. The company will be incorporated as the Farm-

Eighteenth Annual Convention

National Independent Telephone Association

Hotel LaSalle Chicago February 3, 4 and 5

ers' Mutual Telephone. The directors chose P. H. McCormick president and Niels Heggen secretary.

A meeting was recently held at Wildrose for the purpose of organizing a farmers' telephone company to combine with the Williams county mutual company and build a line connecting Ray and Wildrose.

A new phone line has been installed in the country north of Regent.

OHIO.

The Ohio Telephone Company, successors to the Youngstown Telephone Company, announces improvements to their system in Youngstown.

The new Garfield exchange of the Cleveland Telephone Company, on East 105th street, south of Euclid avenue, has been installed, the change having taken place November 21. The structure is a fireproof two-story building of stone and concrete construction and contains the most modern apparatus available in the telephone field. It was formerly known as the Doan exchange.

Plans for the establishment of an exchange station in New Berlin are being worked out in the engineering department of the Bell Telephone Company, headquarters in Akron. Recommendations for this change in the system of handling New Berlin Bell subscribers was made some time ago by Manager Norris of the Canton exchange.

A. T. Cook, receiver for the Union County Farmers' Telephone Company, has been given permission by Judge Brodrick to sell the company's property at public sale at the court house in Marysville on January 6, in order to pay the claims against the company, which has exchanges at West Mansfield, East Liberty and York.

Lima now has a new auto-manual telephone system. The cut-over in the Bell telephone exchange was made December 13, and the automatic system is now in use. The exchange of the Lima Telephone and Telegraph Company will be cut over January 5, when the two plants will then be consolidated.

The Ohio State Telephone Company has declared a quarterly dividend of $1.75 per share on the preferred stock, to be paid January 1, 1915.

The Greenville Home Telephone Company, Greenville, increased $100,000 to $200,000.

The Ohio State Telephone Company has given to its branch at Massillon $69,000 for extensive improvements on its city lines and the installation of a new switchboard, according to Manager W. M. Welker. It has not been decided when the improvements will be commenced.

Cincinnati & Suburban Bell Telephone Company has declared the regular quarterly dividend of 2½ per cent on its capital stock, payable October 1 to stock of record of September 22. Transfer books will be closed from September 23 to September 30.

OKLAHOMA.

The Square Deal Telephone Company of Cleora; capital stock, $4,000. Incorporators: W. H. Morrison, Ed Lunday, Cleora; Frank Franklin, Vinita.

Wheatland Telephone Company of Wheatland; capital, $900. Incorporators: J. P. McGee, Dan Davis, T. D. Donoghue, L. N. Williams, Wheatland.

Union Rural Telephone Company of Waynoka. Capital stock, $1,250. Incorporators: D. H. Lockart, Haskew; Robert Hilch, Pringy; M. Wyckoff, Waynoka, and Charles Evans, Quinlan.

The Cincinnati & Suburban Bell Telephone Company has taken possession of its new home at Fourth and Hammond streets, Cincinnati. The entire office force was installed in the handsome new building. It will be some months before the main exchange can be located in the building, as the work of installing the new switchboard will take until November 15. The structure, twelve stories in height, has been planned with an eye to practical use and efficiency of departmental work, with extra space provided for a large future growth of the company's office working force. The building is handsomely appointed throughout and everything arranged for the comfort and convenience of the employes.

Application has been filed with the Ohio state public utilities commission for consent to sell at par $50,000 5½ per cent fifteen-year bonds by the Clinton Telephone Company for extensions and improvements.

A new switchboard and other new equipment is being installed in the local exchange of the Lemoyne Telephone Company.

The Bell Telephone Company is planning to improve its service to Struthers and East Youngstown. A lease has been secured on the proposed new K. of P. temple for a period of fourteen years. The telephone company will occupy the ground floor. When new switchboards and equipment are installed in the new quarters the service in Struthers and East Youngstown will be equal if not superior to that in Youngstown.

The Ohio State Telephone Company has declared an initial dividend on its 7 per cent preferred stock to cover the period from July 23 to September 30, 1914. The dividend is payable October 1 to holders of record September 25. The exact amount is not stated, but it should be around $1.32 a share. This odd amount is necessary to bring subsequent dividends into the usual quarterly divisions of the year.

OREGON.

The Pacific Telephone & Telegraph Company moved into its new home at the corner of Oak and Park streets Portland, August 1. The mechanical equipment will be transferred gradually. The entire transfer will probably require three or four years. The new building is a class A steel frame, reinforced concrete. Throughout the building there is no wood construction exposed, with the exception of the doors and window frames, which are covered with steel. Property, including structure and equipment, is valued at nearly $15,000,000.

An increase of approximately 20 per cent in rates has been granted to the Siuslaw Home Telephone Company of Salem by the state railroad commission.

PENNSYLVANIA.

The Johnstown Telephone Company, Johnstown, has filed notice of increase of stock from $7,000,000 to $8,000,000.

The conduit system planned by the Consolidated Telephone Company, in Allentown, is almost completed.

At a meeting of the stockholders of the Bell Telephone Company of Pennsylvania recently the purchase of the properties of the Prospect Telephone Company and the Chanceford Telephone Company was approved—the sum of $10 for each share of the outstanding capital stock of the vendor corporations to be paid to the holders thereof. The stockholders of the selling companies also approved the sale.

The Bell Telephone lines in Allentown, Bethlehem and Easton were very bady damaged by a severe storm on December 7.

Directors of the Consolidated Telephone Company of Pennsylvania have approved a plan for the installation of new plants at Carbondale, Olyphant and Jermyn at a cost of $39,312. A new repair shop is to be built at Hazleton at a cost of $2,600, and the exchange at Reading is to be improved at a cost of $10,479. It was decided to improve the company's toll lines on plans submitted by the engineers and to rebuild the system at Allentown. The total cost of rehabilitating the property of the company is estimated at $400,000.

Sheriff Myers recently sold the property of the Easton & Bethlehem Telephone Company, including its exchanges in Easton, Northampton Heights, Bethlehem, Freemansburg and Hellertown, to J. Davis Brodhead, an attorney for $1,378.75. The company defaulted on the interest on its bonds and a mortgage for $300,000 was foreclosed. Mr. Brodhead represented the bondholders.

SOUTH DAKOTA.

The telephone poles, wires and cables have been removed from the Main street at Webster.

Articles of incorporation have been filed for the Charles Mix County Telephone Company at Platte for a rural system, with a capital of $5,000; incorporators, H. Harding, S. T. Hansen, S. T. Ely, Thomas Monsheim, J. P. Campbell, James Nash of Pierre.

A transaction has been concluded whereby the Farmers' Telephone Company has become the owner of the Hayti telephone system. It is expected the change of ownership will result in the service being greatly improved.

J. P. Eberhart of Tripp has become the owner of the Lane telephone exchange at Lane.

The annual convention of the South Dakota Independent Telephone Association was held at Carpenter Hall, Sioux Falls, December 16 and 17. Many interesting addresses were delivered and the following officers were elected: President, J. A. Steninger; vice-president, H. P. Hartwell; secretary-treasurer, A. S. Hall. The members of the executive committee are: J. A. Steninger, B. M. Ryan, A. S. Hall, J. Wilson, E. C. Kart, C. B. Miller and R. E. Cameron.

The Union Telephone Company, of Hartford, has rented the room in the Kingsbery building now occupied by Dr. Green, and is preparing to move into it. This will make a very desirable office for the company.

Consolidation of the two telephone systems in Iroquois is anticipated as the result of the conference there between W. G. Bickelhaupt, secretary of the Dakota Central Telephone Company; H. E. Vollmer, district manager, with Thomas Tyrell and T. J. Murphy, president and secretary of the Farmers' exchange.

Farmers in the northwest part of Tripp county have taken steps for the organization of a telephone system that will cover that part of the county with a network of rural lines. These lines will connect with the lines out of Hamill on the northeast and with the big system out of Colome on the southeast.

TENNESSEE.

Haydenburg Home Telephone Company; capital $1,000. Incorporators: R. H. Webb, W. C. Mosley, J. E. Hancock, J. C. Ray, T. B. Witcher; to construct a telephone line from Haydenburg, Jackson county, to North Springs, via Rough Point and Heucely Creek, all in Jackson county.

Celino Home Telephone Company, Clay county; capital, $1,000. Incorporators: W. T. Moore, H. H. Kife, T. H. Haile, W. N. Gray, W. L. Brown, C. R. Willis and M. F. Hayes.

TEXAS.

John Monix, recently of Hempstead, has become the owner of the telephone exchange at Sunnyside.

Sabine Citizens' Telephone Company, Hemphill, Sabine county; capital stock, $5,000. Incorporators: A. M. Jones, R. H. Minton, H. B. Arnold.

A movement has been started by the chamber of commerce looking toward a merger of the two telephone exchanges doing business in Temple.

VIRGINIA.

The new exchange of the Chesapeake and Potomac Telephone Company, in the Martin building, Norfolk, now receiving finishing touches, is expected to be occupied by December 20.

WASHINGTON.

Farmers residing on the rural mail route No. 1 running out of Cheney will establish an independent telephone system connecting with the city, according to articles of incorporation filed with the Spokane county auditor recently. The company is to be known as the Malloy Prairie Telephone and Telegraph Company, and a nominal capitalization of $1,000 is authorized. The incorporators are: W. E. Wood, Joseph Tucker, J. W. Ward, C. E. Svenson and J. W. Goodykoontz, all residing on the rural mail route near Cheney.

The stockholders of the Rural Telephone Company, Milton, elected the following directors: Harry Huber, A. R. Shumway, J. H. Coffman, S. H. Boerstler and S. E. Simonds. Mr. Huber was chosen president and Will Hopson secretary.

The Home Telephone company of Spokane purchased $10,000 worth of cable and wire for contemplated extension and enlargements of its local system. The purchase was made by H. R. Risley, general manager of the Interstate Consolidated Telephone company. The order was to rush the goods to Spokane. There is in this one order two carloads of material and approximately 7,082,500 feet of wire, or, roughly speaking, 1,341 miles.

Application was recently made to the Louis county commission of Centralia for a franchise to operate and maintain telephone lines in Louis county by the Boistfort Telephone company. The farmers of the Salzer valley are preparing to incorporate for the purpose of constructing these telephone lines.

WEST VIRGINIA.

The county court of Marshall county granted the Bell Telephone company a franchise to erect poles and to maintain and operate its lines on the public highways of the county for a period of fifty years. The granting of the franchise settled a controversy between the county court and the company extending over a period of several years.

S. M. Noyes, recently appointed by the federal court as special master in the case of Cyrus Huling vs. the National Telephone company of West Virginia, started the work of taking testimony relative to the case. He has been instructed to secure testimony regarding the bonded indebtedness of the company, the assets and whether the company is insolvent. He is to report his findings to the court.

V. O. Wallace, of Chehalis, representing the Washington Forest Fire association, says that organization has bought the old telephone line to Spirit Lake from R. C. Lange. The association will put the line in good order and use it in connection with its work in patroling the timber belt of Cowlitz county.

WEST VIRGINIA.

The Bell Telephone exchange, at Farmington, was destroyed by fire.

Clay Telephone Company, of Henry, has been incorporated to operate a telephone line. The capital stock is $5,000 and the incorporators are B. C. Eakle, P. M. Summers, James Reed, A. T. Copenhaver, R. A. Hamrick, H. M. Young and others, all of Clay, W. Va.

The Central District Printing and Telephone Company will make improvements in the Wheeling sub district, which will amount to nearly $30,000, and will include the surrounding towns of Warwood, Urichsville and Altenheim.

Mutual Telephone Company, of Kincaid; to operate telephone lines; capital stock $5,000; incorporators, M. E. Kincaid, E. R. Kincaid, J. E. Kincaid, Kellis Kincaid and W. E. Brown, all of Kincaid.

WISCONSIN.

A telephone cable is being strung between Waterford and Rochester by linemen of the Wisconsin Telephone Company. The cable will contain one hundred wires and will make a great improvement in the service.

The Lindsey Telephone Company has decided to construct another trunk line between its central office and that of the Marshfield Telephone Company, a distance of seven miles. The estimated cost of this improvement is given as $1,000.

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